

COMPUTERWORLD

\$2 A COPY; \$44/YEAR

MARCH 3, 1986

VOL. XX, NO. 9



Stock charts in full, page 113.

Executive Report

Using data storage devices effectively/33

In Depth

Multilayer vs. local net: Choose wisely/51

TOP OF THE NEWS

IBM's controversial bid to lift the 1984 Consent Decree is mired in Justice Department bureaucracy. **Page 114.**

Borland International moves into the artificial intelligence market with Turbo Prolog. **Page 14.**

The federal government kicks off Go-for-12 in a bid to shorten computer procurement. **Page 2.**

A programmer workbench mimics Calidata's ADS/On-Line, early users say. **Page 29.**

Optical storage expands desktop use, according to industry leaders, some of whom are meeting at Microsoft's CD-ROM conference this week. **Page 23.**

Memorex expects to make approximately 12 product announcements during 1986, all geared to recovering market share. In its bid to recover market share in the past couple of years, the company will focus on building peripherals for IBM's System/34, 36 and 38 products, double-density disk drives for large system users and cache storage devices. **Page 24.**

Berkeley, Calif.-based Sybase, Inc. will introduce by mid-year a relational data management system that combines a 32-bit data base server with query, reporting and development tools running on the VMEbus and VMEbus. The company is claiming that early benchmarks of the system show performance of roughly 30 transactions per second on a 1 million instructions per second version of the Dataserver processor. **Page 25.**

Kurzweil Applied Intelligence, Inc.'s Voice Writer, a voice-recognition word processing device that will handle discrete, noncontinuous speech at up to 60 words per minute, is on track for a third-quarter introduction, inventer Raymond Kurzweil disclosed last week. See NEWS page 4

IRS tests pick Zenith laptop

By Mitch Betts

WASHINGTON, D.C. — The Internal Revenue Service last week awarded its hotly contested contract for 10,000 laptop microcomputers to Zenith Data Systems Corp. The contract, the largest single purchase of laptops ever, is worth \$27.6 million and had been widely reported as going to IBM.

Zenith's winning entry was its Z-171 model, an IBM-compatible unit with a 25-line, backlit LCD and two 5 1/4-in. disk drives. The laptop, which weighs in at 14.3 pounds and costs \$2,399, will be used by IRS tax auditors in on-site field audits.

Packaged with the Z-171 in the winning bid was the software program Enable. See IRS page 4

HP launches long-awaited RISC effort

But Spectrum units 930, 950 not ready until late '86, '87

By Jeffry Sooter

PALO ALTO, Calif. — In one of the most eagerly anticipated product debuts of recent months, Hewlett-Packard Co. last week publicly unveiled the first two products of its ambitious Spectrum program: The 930 and 950 in a nationwide press teleconference. Both systems incorporate a different architecture from HP's popular 3000 family CPU's but retain compatibility with the older models.

The units represent a radical departure from conventional large systems architecture in their incorporation of reduced instruction set computing (RISC) technology, by embodying simpler design and fewer chips than the 3000 family units, is capable of producing machines with smaller footprints and more power.

HP's 930 and 950 are said to provide up to three times greater internal throughput than the company's previous top-of-the-line business system, the 3000/68. Shipments of the 930 will begin during the fourth quarter of 1986, while the 950 will not be available until the second half of 1987. However, the company announced immediate availability of a non-RISC 3000/70, which provides 20% to 35% greater performance than the 3000/68 for a 20% lower price.

Current HP users contacted by Computerworld warmly greeted the announcement. "I was impressed with the methodology they use in their new architecture, especially the decision to put a dictionary on multiple disks," said Gordon Stock.

See HP page 7

AT&T's E-mail hits soft market

By Elisabeth Horwitt

NEW YORK — AT&T, the world's largest communications company, last week entered the electronic messaging service market amid evidence that the market is not expanding as rapidly as was once anticipated.

AT&T's new service, called AT&T Mail, offers software that relieves users of such electronic mail chores as routing and formatting. The company claims the software also enables users to save on service charges by bypassing the cost of IBM Personal Computer or AT&T Personal Computer 6300 or 5B2 before signing on to AT&T Mail.

Spokesmen for companies that tested AT&T Mail last year cited the easy-to-use AT&T Mail page 12

CW EXCLUSIVE

Expert system: Boeing AI academy schools in-house talent

By Peggy Weis

Artificial intelligence. Everybody wants it, few companies can obtain it. One reason is that experts are still at a premium, especially experts capable of developing commercial applications. Boeing Co. solved this particular problem in a very straightforward way — by nurturing its own experts.

When the U.S. Defense Dept. announced in 1981 that artificial intelligence would be a requirement in defense contract bids beginning in the late 1980s, defense industry leader Boeing of Seattle charged its Bellevue, Wash.-based subsidiary, Boeing Computer Services Co., to develop the expertise. Boeing Computer Services manages es-

sentially all computing resources of Boeing and also markets remote computing services, training and support to outside clients.

"We decided AI was the data base of the '80s," recalls Bruce Wilson, Boeing Computer Services chief scientist. "If data bases are valuable, knowledge bases are even more valuable. Knowledge bases are the product line of tomorrow."

To hire the developers of tomorrow's products, Boeing Computer Services first canvassed the academic world and found that fewer than 50 degrees in AI technology had been awarded by only a handful of

schools. Boeing's solution to the dearth of experts was to stock up from within.

In 1982, as a response to the corporate mandate, Boeing Computer Services established the Artificial Intelligence Source Center. Within its Advanced Technology Applications Division, and in early 1984, it launched an associates program within the new center.

Last week, the third class of 10 Boeing AI associates graduated after a year of intensive classroom training, homework and development of individual projects.

The projects use AI techniques to solve problems in the Boeing divisions from

See BOEING page 15

***** 5-DIGIT 4B106
***** CLOUDS 9505-N
UNIVERSITY MICROFILMS INT'L
SERIALS PUBLICATIONS
300 N ZEEB RD
ANN ARBOR

NEWSPAPER



NEWS

GSA launches study to cut procurement to 12 months

By Mitch Betts

WASHINGTON, D.C. — When Thomas K. Lewis Jr. left the White House data processing staff to return to the private sector as vice-president for DP at First Boston Corp. in New York, he was struck by two things: the bigger paychecks and the faster pace of computer procurements in the private sector.

"Here we've made decisions to procure mainframes in a week or two. We don't have all of the bureaucracy and red tape associated with trying to make decisions," Lewis said.

In the federal government, the acquisition of a complex mainframe system typically takes about three years. Some exemplary procurements are wrapped up in as little as 11 months, while some horrors stretch out to eight years, according to officials at the U.S. General Services Administration (GSA).

In addition to frustrating the end-

user organization, these delays contribute to the government's problem with obsolete hardware, according to GSA administrator Terence C. Golden. In his prior job as a U.S. Department of the Treasury official, Golden said, he found that the multilayer procurement process often resulted in a system that was "already one generation behind by the time it landed in our computer room."

Golden said the procurement "labyrinth" must be reformed to help agencies acquire the technologies needed to improve productivity in the government, particularly in the prevailing budget-cutting climate.

Hoping to find out how to cut the red tape without trampling on the government's requirements for full competition and oversight, Golden last week launched his "Go-for-12" program to search for and test methods.

See GSA page 6



GSA administrator Golden

More blacks seek DP careers

By Charles Babcock

NEWARK, N.J. — More blacks are entering the data processing profession, but one of their major points of entry, computer programming, is becoming choked with too many applicants, said Earl Pace, chairman of Pace Data Systems, a custom software house and service bureau in Plainfield, N.J.

"The trade schools are pouring out people who graduate only to find they can't find jobs. Unfortunately, many of them are black," Pace said during an interview recently at the Black Issues Convention in Newark.

Pace, the founder of Black Data Processing Associates (BDPA), was the keynote speaker at the convention, which was organized by the BDPA and other black professional groups to encourage blacks to work among blacks and to interest black students in technology professions.

Pace said blacks are still disproportionately concentrated in the lower level jobs of programming, computer operations and data entry

rather than in management.

Gail O'Neal, founder of communications consulting firm Genisys World Corp. in Cliffside, N.J., said opportunity exists for blacks in DP, but in many cases they must come to it by a circuitous route. She said she was going to teach math but she realized that the prospect was slim, so she switched to computer planning.

After getting a master's degree in business administration, she went to work for Exxon Corp. in information services, where she was encouraged to go into programming and applications development. She served as a systems analyst and applications developer for Exxon and AT&T before deciding to become a consultant.

"It was on the job that I made the transition. Someone else pushed me into it," she said.

BDPA, the Urban League and IBM are conducting a pilot project in Cleveland to increase computer literacy among black students. If successful, the organizations are considering making it a national effort.

Amdahl cuts prices on mainframes

By Jeffry Beesley

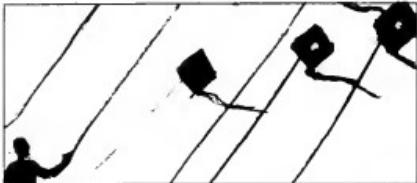
SUNNYVALE, Calif. — Amdahl Corp. last week countered IBM's latest mainframe price cuts by reducing prices for all 10 of its 580 series processors. The move will reportedly allow the company to regain the competitive position it lost briefly as a result of IBM's recent announcement.

In the wake of IBM's cuts, which apply only to the U.S., the price of Amdahl's 5890 Model 200 was cut 9.1% to \$4.5 million, costing 15% less than IBM's 3990 Model 200 while providing comparable performance, according to Amdahl marketing Vice-President Ollie Nutt.

A typical 5890 Model 300 configuration was reduced in price by 8.8% to \$5.5 million, costing the same as the 3990 Model 200 but with 25% greater computing power, Nutt said last week during a press conference at Amdahl's corporate headquarters.

Amdahl's reductions come hard on the heels of IBM's recent decision to extend its 3090 series downward into two additional models and to pare the prices of its existing 3090 and 3080 processors by 10% and 20%, respectively. The two low-end extensions include the 3090 Model 180 and an intentionally degraded version, the 3090 Model 150.

In this issue



See Page 63

NEWS

Digital Equipment Corp. targeted niches in the IBM market during December '85 in Boston last week. / 6

The introduction of Hewlett-Packard's RISC-based 3000 Series 930 and 950 marks a turning point in the firm's long-term product strategy. / 8

HP's Spectrum announcement includes the introduction several software products, including a DBMS supporting both relational and networked capabilities. / 10

CompuServ and MCI Communications announce the first linkup between two U.S. electronic mail services. / 12

Borland introduces Turbo Prolog, promising a toolbox and new applications in the AI arena. / 14

COMMUNICATIONS

DEC announces the VAX DS1 Transport Service (VOTS), software that implements the transport layer of the seven-layer Open Systems Interconnect networking model on VAXs and Microvaxes running VMS. / 19

Data General released communications software that allows its MV/Eclipse machines to talk to each other over SNA networks. / 19

MICROCOMPUTERS

New England Software introduces a RAM-resident graphics package. / 23

Software vendors predict promising applications for CD-ROM players. / 23

SOFTWARE & SERVICES

Beta users preview a start-up company's micro-based programmer's workbench for Cullinet's ADS/On-Line. / 29

Floating Point Systems, Inc. enhanced and expanded its scientific computer line. / 31

SYSTEMS & PERIPHERALS

Analysts and computer designers on RISC-based computer architecture. / 31

Floating Point Systems, Inc. enhanced and expanded its scientific computer line. / 31

COMPUTER INDUSTRY

Peachtree Software is hoping for a comeback in the microcomputer accounting software market. / 114

Although the U.S. Justice Department's review of the 1956 IBM Consent Decree officially remains open, there has been virtually no review activity in the past year. / 114

EXECUTIVE REPORT

Managing data storage: Solving MIS and end-user data storage problems often requires the use of current technology, such as solid state devices and cache buffers, or the use of ingenious alternatives, such as shadowing techniques. Either approach, however, begins with an evaluation of needs. By Donna Raimondi. / 33

IN DEPTH

Multuser computer vs. local-area net: A careful look around corporate America reveals managers choose multuser solutions for all the wrong reasons. By John Donnis, Sharon Echomson and Lynn Anderson. / 51

Lawsuits batter the software industry: The Big Business of law threatens the cottage industry of software with litigation. Should users sue vendors for developing imperfect programs? By Rick Martin. / 63

OPINION & ANALYSIS

Woh on communications between programmer and end user. / 17

McQuillan on hybrid telecommunications networks. / 19

Bender's notes and quotes on the Personal Computer Forum. / 23

Galant on vendors' efforts to ship according to schedule. / 29

Connolly on the keys to good computer service. / 31

Wilder on the reception of DEC's new product cycle. / 114

DEPARTMENTS



See Page 16

Editorial. / 18

Technology Time. / 16

New Products. / 67

Calendar. / 89

Nickles & Dimes. / 93

Executive Corner. / 97

MIS DIRECTORS, DP MANAGERS, DATA BASE ADMINISTRATORS, SYSTEMS ANALYSTS, PROGRAMMERS:

YOU HAVE NOTHING TO FEAR BUT FUD ITSELF



"It looks like a good idea, but let's just wait 'til they perfect it."

Fear. Uncertainty. Doubt. In an industry driven by advanced technology, it's ironic how many companies are timid when it comes to something new.

4th generation languages and relational data base management systems are the best answer to productivity problems that threaten to strangle the industry. Yet some data processing professionals continue to worry about using this new technology.

We have some reassuring news. Specifically about ADR/IDEAL™, our 4th generation application development system. It comes via INPUT, one of the most experienced and most respected research firms serving the information services industry.

In a major study of ADR/IDEAL users, they asked about productivity. According to INPUT, "the average productivity gain found [using ADR/IDEAL] versus COBOL was 4.41." More than 300%. Not only that, INPUT also reports "15.4% of respondents obtained productivity gains of 10.1 or more."

They asked about the applications backlog. And almost three out of four ADR/IDEAL users told INPUT that "ADR/IDEAL could replace COBOL or PL/I for the majority of their backlogged applications."

They asked about production. INPUT found that among ADR/IDEAL users "high volume performance is on average more than satisfactory."

They asked ADR/IDEAL users if they would recommend it. And 82.5% told INPUT it is very likely they would recommend ADR/IDEAL. No user said they would not recommend it. INPUT characterizes this as "an unusually high willingness to recommend."

INPUT asked most of the questions you would ask about ADR/IDEAL. And it's nice to know our users gave the same answers we give.

To get the answers to your questions about how ADR/IDEAL delivers on the promise of a 4th generation language and request a copy of the study, just mail us the coupon. Or call 1-800-ADR-WARE.

ADR WE KEEP WRITING THE HISTORY OF SOFTWARE

AN AMERICAN COMPANY
Applied Data Research® Orchard Road & Rt. 206, CN-8,
Princeton, NJ 08540 1-800-ADR-WARE In NJ, 1-201-374-9000

Please send me more information about ADR/IDEAL.

Please have an ADR® Representative call with information about the study.

Name _____ Position _____

Company _____ Phone _____

Address _____

City _____ State _____ Zip _____

Computer Equipment _____

For information about ADR Seminars call 1-800-ADR-WARE.

DR 3388
1-800-ADR-WARE

QUICK!

**Name the fastest
VM dump restore,
and the fastest
VM sort program.**

**(SYBACK & SyncSort CMS.
What took you so long?)**

Call (201) 930-9700.

**Meet our super-
sonic systems.**



syncsort
INC.

If you didn't choose SYBACK and SyncSort CMS as the fastest in their categories, do not go directly to jail. But read this very, very carefully.

SYBACK, our fast dump restore for VM systems, and SyncSort CMS, the only high-technology sort for VM/CMS, represent a great technological leap forward. No other programs of their type can provide all three of the following positive advantages:

(1) THE FASTEST VM PERFORMANCE: SYBACK and SyncSort CMS make data move like greased lightning. Compared to their "competitors," these programs can save a tremendous amount of computer resources:

- 50% in Elapsed Time;
- 45% in VTime;
- 55% in TTime;
- 75% in SIOs.

These savings are the result of our exclusive Fluid Buffering Technique (FBT). First developed in OS and DOS sorting, we've now extended the benefits of FBT to VM backups and sorts.

(2) THE BEST VM PRODUCTIVITY: SYBACK and SyncSort CMS have tremendous operational flexibility and user friendliness. They're rich in features designed to reduce human intervention in backup and sorting:

- **SYBACK** — Automatic backup based on CP directory • Stand-alone restore capability • Incremental backup facility • Catalog of backup operations • Multi-tasking and execution under CMS • Interactive command processing • Standard-label tape support • Callable by user programs • DASD to DASD conversion and copying. Much, much more.
- **SyncSort CMS** — Sorts CMS, SAM (OS or DOS), or VSAM files • Can be invoked from COBOL, PL/I or BAL programs • Dynamically allocates disk space • Selects relevant records for sorting • Reformats records on output • Performs summaries of designated numeric fields • Produces reports with pagination, headings and dates • Can often produce simple reports in one day rather than, say, five. Much more, too.

(3) THE FINEST TECHNICAL SERVICE: Our Technical Service specialists are experts in their individual fields. You can count on fast, efficient, courteous service in both backup or sorting operations. More than 85% of all user requests for service are resolved within 24 hours.

CAVEAT EMPOR: As with all performance software programs, the best way to find out what SYBACK and SyncSort CMS can do is to benchmark them yourself against your present programs.

That should help you make up your mind fast!

Syncsort Incorporated 50 Tice Boulevard, CN18, Woodcliff Lake, N.J. 07675

HP launches RISC effort

From page 1

inger, a software specialist who works with HP 3000/68s at the Ford Motor Co. Electrical and Electronics Division.

However, many industry experts remain skeptical at the company's short-term prospects.

Analyst George Colony, head of Boston-based Forrester Research, Inc., said that if enough HP customers delay purchases in favor of the 930 or 950 machines, the company's order rates could collapse.

Ross Scruggs, president of Oakland, Calif.-based Telionix, Inc., an HP 3000/37 user, said the Series 70 will not need to be "upgraded" to need a quantum jump in horsepower." But, he added, "the people who are going to be upset by the delayed shipments are users who are quickly running out of juice and who have large, integrated applications that won't fit in one box."

A strategic investment?

Gartner Group, Inc., analyst George Weiss said the RISC machines will only generate marginally to revenue for an extended period because HP is offering upgrade credits that allow users to apply up to 80% of a Series 70 purchase toward purchase of a 930. But, Weiss added, "HP may look upon Spectrum primarily as a strategic investment."

Dean Morton, HP's chief operating officer, sharply defended his company in an interview in Boston last week. "Clearly, we have made our choice to go with RISC architecture because we feel it will serve us and serve our customers better for the next 10 or 15 years than in simply making a major investment in a more conventional architecture."

In a recent interview, Doug Sprung, general manager of HP's Computer Systems Division, described the 930 and 950 as the first in a series that will support 48-bit addressing and that can be theoretically scaled to 64 bits. At 32 bits, the 930 and 950 would provide a memory space that is 65,000 times larger than conventional 32-bit processors.

Since announcing the Spectrum project in 1983, HP officials have emphasized that they wanted a common technological base for all future business and technical systems. The company said RISC-based technical products for engineering and manufacturing applications will be introduced around 1988.

One of the legendary Silicon Valley start-ups, has staked a large portion of its future on RISC technology. "It is an informed gamble," HP's Morton said in an interview on the day of the announcement. "We don't think that the risk is any greater than it would be in trying to push the state of the art in semiconductor design or a lot of other paths that might have been chosen."

The 930 and 950 push HP's line into the IBM 4381-class performance range, Sprung said. Implemented in transistor-transistor logic technology, the 930 supports up to 24M bytes of main memory, executes 4.5 million instructions per second (MIPS) and provides twice the internal throughput of the 3000/68.

The 950, by contrast, based on

one-micron N-channel MOS circuitry and, at 6.7 MIPS, outperforms the 3000/68 by threefold, he added.

The RISC machines preserve full compatibility with existing 3000-class applications, HP officials said. To take full advantage of the processor's expanded performance, such applications will have to be recompiled, though, not rewritten.

Axle Computer Systems, Inc., an independent developer of HP software applications, ran one of its Series 68 commercial applications on a 930 at native-mode performance after the source code was recompiled and streamlined by the CPU's optimizing compiler, said Martin Browne, vice-president of software development at Axle.

The RISC technology incorporates 140 instructions rather than the 250 instructions used in earlier HP 3000

NEW HEWLETT-PACKARD CO. CPUS			
	Series 70	Series 930	
MIPS	1.6	4.5	6.7
Memory Bandwidth	8	12	18
Machine Cycle Time (Nsec)	75	125	Not available
Word Length (bytes)	8-16	16-32	32-64
Technology	Emitter-coupled logic	Transistor-transistor logic	N-channel MOS
Base Price	\$100,000	\$225,000	\$300,000-\$350,000
Delivery	Now	Fourth-quarter 1986	Second-half 1987

■ 100 applications based on HP 3000/68 except 3.

CHIPS

processors. The architecture also involves replacement of microcode with high-level language instructions called "millicode" in ordinary memo-

ry, use of segregated caches for data and instructions, fixed-length and fixed-format instructions, execution

See HP page 8

TAPE UPGRATE

- SUPPORT OS VS MVS XA
- DATA SECURITY ERASE
- RECOVERY DATA CHECK TAPES
- RECORD OR BLOCK PRINT
- TAPE FILE ANALYSIS
- TAPE COPY 3420 TO 3480
- BLOCK MODIFICATIONS AND SCAN
- TAPE CERTIFICATION
- SUPPORT 3420-3480
- TAPE LABELING

INNOVATION DATA PROCESSING

AUTHORIZED FOR IBM OS, VS AND MVS XA

FAT5 EFILE
HARDWARE: 4, UBT, F
SMPF

5 REASONS WHY PDSFAST IS THE CORPORATE STANDARD AT OVER 500 DATA CENTERS

- 1 DASD Space Reclamation** PDSFAST can increase DASD space reclamation by 40 to 60 percent.
- 2 DASD Management** PDSFAST interfaces with ALL EXISTING DASD MANAGEMENT PACKAGES reducing elapsed times by 75 to 90 percent.
- 3 IEBCOPY Usage** PDSFAST is a JCL-transparent replacement for lebcopy. It will compress, copy and unload PDS datasets to tape or disk at 5 to 80 times the speed of lebcopy.
- 4 SPFCOPY** Provides ultra high speed compression under SPF 3.1 WITHOUT REQUIRING AUTHORIZATION.
- 5 SMP Processing** Speeds up ALL LEVELS of SMP processing by 25 to 90 percent.

PDSFAST benchmarks taken from user evaluations:

	Elapsed Time	CPU Time	EXCP's	Job Cost
52 cyl. PDS Compress				
lebcopy	67 min. 18 sec.	12 min. 27 sec.	103,486	\$131.05
PDSFAST	3 min. 23 sec.	.8 sec.	712	\$4.22
12 cyl. PDS Copy				
lebcopy	9 min. 14 sec.	1 min. 20 sec.	10,792	\$18.47
PDSFAST	48 sec.	.7 sec.	122	\$1.75
47 cyl. PDS Unload to Tape				
lebcopy	58 min.	14 min. 52 sec.	97,253	\$92.05
PDSFAST	4 min. 3 sec.	37 sec.	911	\$5.74
3380 TSO Volume Compress 2,679 Individual PDS's				
PDSFAST Driver	11 min. 7 sec.	31 sec.	8,299	\$29.87

The PDSFAST driver interfaces with all DASD management and DEFrag packages.

As you can see PDSFAST is *ultrafast* and cost effective, combining wide ranging performance benefits with transparent operation. Our users tell us PDSFAST is the most impressive performance product they have seen in years.

PDSFAST is saving thousands of dollars daily in human and machine resources at hundreds of sites worldwide. We are sure PDSFAST will benefit your installation.

For further information about PDSFAST call SEA at (212) 206-7660,
located at 150 Fifth Avenue, New York, NY 10011.

SOFTWARE ENGINEERING OF AMERICA

SEA

Software offerings accompany Spectrum announcement

DBMS has relational, networked capabilities

By Maury McNamee

PALO ALTO, Calif. — Last week's Spectrum announcement from Hewlett-Packard Co. was laced with several major software announcements aimed at easily migrating current users over to HP's Precision Architecture.

A data base management system with support for both relational and networked capabilities was seen by analysts as the most significant among those announced.

"The new data base facility Albase/XL is enormously appealing to users," according to Linda O'Keeffe, director of Office Systems Industry Service at Dataquest, Inc. Users will now be able to access and share data stored in both relational and networked methods. "In the past, users of relational DBMS methods were willing to give up some system performance in exchange for convenience," said Dataquest's Gwen Petrone, director of the Business Computer Systems Industry Service. "Giving them the choice is a wonderful capability," she said.

Albase/XL DBMS for the new Series 930 and 950 computers eliminates the need to maintain both a relational and a networked data base. It includes two interfaces: the HP

Structured Query Language (HPSQL) interface, a relational product that accepts IBM's SQL commands in both programmatic and interactive forms; and the HPImage interface, which provides transparent network-model access to data bases.

HPImage is said to increase processing speeds by incorporating pre-determined data access paths. It also includes generic search capabilities that allow users to conduct a search based on a partial definition of an item name.

Current HP Turboimage applications are compatible with the new DBMS.

Albase/XL is included in the total price of the HP 3000 Series 930. Purchased alone, it costs \$30,000 and will be available in the fourth quarter.

HP also announced an enhanced version of its MPE/V operating system. Dubbed MPE/XL, the new operating system includes a proprietary mapped-file capability said to enhance I/O throughput by directly accessing data files stored on disk.

The company also introduced a new set of language compilers for the Spectrum machines. Designed to work with HP's reduced instruction set computer architecture, the For-

tran 77/XL, Pascal II/XL and Cobol II/XL compilers are compatible with MPE/V-based compilers. Fortran 77/XL and Pascal/XL cost \$7,000. The Cobol II/XL costs \$5,000. Tranc 77/XL will be available in the fourth quarter.

The firm also announced a set of Spectrum applications development tools. The HP Toolkit/XL is said to provide facilities for full screen editing as well as symbolic debug capabilities for developers using the new Fortran, Pascal and Cobol compilers. Toolkit/XL costs \$7,000. It will also be available in the fourth quarter.

HP also unveiled

IBM connection capabilities with Systems Network Architecture (SNA) Server software and SNA Server Access software. HP's SNA Server software can be combined with HP SNA Server Access software to connect to IBM mainframes running MVS or VM. HP's SNA/Network Remote Job Entry or SNA/Interactive Mainframe Facility to access with IBM mainframes running MVS systems in both interactive and batch modes.

The HP SNA Server software can reside on an HP 3000 system acting as a file server, and SNA Server Access software works on each networked HP 3000. The HP file serv-

er can be used concurrently for other applications.

The HP SNA Server software costs \$1,000 for an HP 3000 running MPE/V. HP SNA Server Access software is \$1,200 for the new Series 930 model, and \$1,000 for the Series 70 and older HP 3000 models.

In addition to the Spectrum software, HP announced several new products for machines running the MPE/V operating system. HPSQL/V is a relational DBMS for the MPE/V systems, but its application programs are fully compatible with the HPSQL interface of Albase/XL, the company said. The product costs \$15,000.

Other software products introduced last week included:

- The HP System Dictionary/V for both the Series 930 and MPE/V-based machines. The System Dictionary/V documents HP 3000 system data, programs and files, user access and network configurations. The System Dictionary/V costs \$6,500 for Series 3000 machines running MPE/V. It costs \$7,500 on the Series 930.

- Business Report Writer/V, a report writing system that is said to allow users to put data from several sources into a single report. The product is priced at \$8,000.

- Turbolmage DBChange/V for modifying data structures and expanding the capacity for HP Turboimage data base. The product costs \$6,000.

'The new data base is enormously appealing to users.'

— Linda O'Keeffe
Dataquest, Inc.

For MVS (SP and XA),
DOS/VSE,
and VMS/CMS

SMITHERS,
WE DESPERATELY NEED DEVELOPMENT, MAINTENANCE AND TESTING TOOLS!

COMPAREX DOES IT ALL SIR!

A tool for all reasons

Ever have the need to compare two files, only to find that the in-house comparison utility was unreliable? Or couldn't resynchronize after finding a mismatch? Or couldn't compare ISAM or VSAM or database files directly?...with COMPAREX, you can!

COMPAREX directly compares most files and their organizations, including data bases: DL1 (IMS and CICS), IDMS, ADABAS, RAMIS II, VSAM, ISAM, OSAM, IAM, PDS, CLIST, PANVALET, LIBRARIBAN, Power queues... and many more.

Call Smithers for more information and a FREE, 30-day trial, at (800) 824-8512 or (916) 535-5535.

COMPAREX, the intelligent comparison utility, is a powerful tool that enables you to:

- Debug programs in record time
- Reconcile new releases or vendor programs quickly and accurately
- Provide effective conversion support
- Reconcile production source to production load modules
- Achieve dramatic savings in programmer time and reductions in development and maintenance backlog

STERLING SOFTWARE
Systems Software Marketing Division

COMPAREX[®]

THE INTELLIGENT COMPARISON UTILITY

11050 White Rock Road, Suite 100, Rancho Cordova, CA 95820



A small price to pay for a full-duplex 2400 bps disk modem that gives you better performance, better features, and lower support costs than anything else available.

The Codex 2220 disk modem. Find out about it. Call 1-800-541-2200.

Microtek and (C) are trademarks of Microtek, Inc. Codex is a registered trademark of Codex Corporation.

Oracle Corporation invites you to the last DBMS Seminar you'll ever have to attend.

WHY 31 OF THE TOP 50 U.S. CORPORATIONS USE THE SAME RELATIONAL DBMS: ORACLE

COMPATIBILITY

The ORACLE® relational database management system is compatible with IBM's SQL/DS and DB2. SQL/DS and DB2 represent IBM's latest generation of database management technology for IBM's largest computers. ORACLE's capabilities and user interface — the SQL language — are identical to those of SQL/DS and DB2. Programs written for SQL/DS and DB2 will run unmodified on ORACLE.

Oracle introduced the first relational DBMS and the first implementation of SQL back in 1979. Today, the largest companies around the world use ORACLE. In fact, INC MAGAZINE ranks Oracle as the fastest-growing major software company in the USA. Surprised? Don't be. ORACLE is the number one relational DBMS, with thousands of installations on IBM mainframes, DEC, DG, HP and most other vendors' minis and micros, including the IBM PC.

To attend the next free, half-day seminar in your area or receive additional information, write Oracle Corp., Dept. CW10, 20 Davis Drive, Belmont, CA 94002, or call 1-800-345-DBMS. From now on, it's the only DBMS phone number you'll ever need.

PORTABILITY

SQL/DS and DB2 run only on IBM mainframes; ORACLE runs on IBM mainframes, DEC, DG, AT&T, HP, Stratus, Sperry, Prime, Honeywell and several other manufacturers' minicomputers, and on a wide range of microcomputers including the IBM PC/XT and PC/AT. ORACLE runs under vendor proprietary operating systems or under UNIX™. All versions of ORACLE are identical and include a complete implementation of SQL — not a subset.

CONNECTABILITY

Having the same software running on your mainframe, minis, and micros greatly simplifies the task of connecting your machines into a network. ORACLE's network software allows microcomputer users to directly access data stored in the shared database on the mainframe or minicomputer, or copy that data into the database on their micros and operate independently.

ORACLE U.S. and Canadian Seminar Schedule

Albany	April 17	Des Moines	March 19	Montreal	April 16, May 14	Singapore	April 24
Albuquerque	March 6	Detroit	March 13, April 8, May 7	New Orleans	April 21, May 19	Salt Lake City	April 3
Amarillo	March 4	Pt. Lauderdale	April 10	New York City	March 13, April 21	San Antonio	April 22
Atlanta	April 1	Ft. Worth	March 8	Orlando	April 9, 22, May 16	San Diego	April 17
Austin	March 25, May 27	Halifax	March 19	Newport Beach	March 18, May 13	San Francisco	March 25, April 24
Baltimore	March 27	Hartford	March 20, April 17, May 15	Oklahoma City	April 15	Seattle	April 3
Boston	March 11, April 15, May 13	Huntington	May 8	Omaha	April 22	Sunnyvale	March 11, April 10, May 8
Chicago	March 13, April 16	Indianapolis	March 11	Orlando	April 9	Syracuse	April 8, May 6
Cincinnati	March 4	Irvine, NJ	March 20, April 15	Ottawa	March 13, April 10, May 8	Toronto	March 4, April 8, May 6
Cleveland	April 2	Kansas City	May 6	Philadelphia	March 22	Utica	March 20
Columbia, SC	March 11	Lansing	March 11	Phoenix	March 27	Vancouver, BC	April 22
Columbus	March 5	Little Rock	March 11	Portland	March 5, May 6	Washington	March 5, 19,
Convent Station, NJ	April 7	Los Angeles	March 13, April 10, May 8	Qatar	June 18	Wichita	April 15
Dallas	April 1, May 6	Lubbock	April 8	Rochester	March 18	Winnipeg	April 17
Deyton	April 3	Milwaukee	May 21	Sacramento	May 13	Winston-Salem	March 27
Denver	March 13, April 8, May 15	Minneapolis	March 27	St. Louis	April 9, May 14		

Relational DBMS. It's what's new. Call (415) 238-2281 today.

Oracle (415) 238-2281 □ Quebec (514) 337-0755 □ Toronto (416) 362-3275

ORACLE U.S. SUPPORT 401-549-4020 □ ORACLE-NORTH JAPAN, THE NETHERLANDS 31-318-40494

© 1989 by Oracle Corporation. ORACLE is a registered trademark of Oracle Corporation. SQL/DS, DB2 and IBM are registered trademarks of IBM. DB2, AS/400, Series 9000, and iSeries are registered trademarks of IBM. Other products mentioned may be trademarks or registered trademarks of their respective companies.

Compuserve, MCI connect their electronic mail services

First U.S. linkup may be trendsetter

By Stanley O'Brien

Last week, in what may be a trendsetting move, Compuserve, Inc. and MCI Communications Corp. announced the first linkup between two U.S. electronic mail services.

MCI Mail subscribers can now exchange electronic messages with users of Compuserve's two electronic mail services, Infoplex and Easyplex. Infoplex is used

by Compuserve's Fortune 500 customers; Easyplex is used by some 270,000 personal computer users who subscribe to the Compuserve Information Service.

"It is a major step toward an electronic postal system, away from isolated, competing mail services," said MCI President J. Robert Harcourt. MCI and Compuserve will continue to function as separate entities, however.

Ties toward interconnectedness

Michael Cavanaugh, executive director of the Electronic Mail Association (EMA),

said that the MCI-Compuserve alliance was part of a trend toward interconnection among electronic messaging services. Another move in that direction was the recent linkup between GTE Telenet Communications Corp., Comshare and Telexcom. Comshare's Envoy 100 messaging service.

"By 1982 to 1986, it will be

known if any service provider is not connected to another," Cavanaugh said.

"Now, you don't know which, if any, electronic mail system someone is on, so you still have to play tele-

phone tag."

The MCI-Compuserve linkup should alleviate but not solve the telephone tag problem. Although more than half a million users can now communicate with one another via the electronic postal systems, there is as yet no sharing of directories, according to MCI spokesman John Houser.

Another potential source of confusion is that the two vendors charge differently for the linkup. A Compuserve user must pay both Compuserve connect time and MCI Mail charges. An

MCI Mail user does not pay extra to communicate with Compuserve users.

Revenue derived from users crossing over between the two systems will be shared between the two companies according to a formula that, according to Houser, is based on "usage and will not be 50-50."

Houser added that MCI is considering linking up with other services. MCI is working with the EMA on a protocol based on MCI Mail's Link protocol that would link all of the association's member service companies.

AT&T E-mail hits soft mark

From page 1

software as the initial reason they chose the service over competitors. "It took us about 10 minutes to train each user on the system," said a spokesman for the test site, New York's R. H. Macy & Co. department store chain.

Despite AT&T's having signed up an estimated 200 business customers through its testing process last year, industry analysts point to declining expectations for electronic mail service revenues

as an indicator of troubles that may lie ahead.

The recently released 1985 Electronic Messaging Report from Link Resources Corp., a New York-based analysis firm specializing in electronic mail, was markedly less optimistic than previous reports. While Link's 1984 report had predicted total 1985 revenues of \$1.2 billion, industry revenues for 1985 of \$474.8 million, the 1985 report projected revenues of \$300 million. The 1984 report had predicted that by 1986, industry revenues would reach \$2.126 billion, yet the 1985 report anticipated that 1990 revenues would be only \$1.648 billion.

Among the reasons the report gave for its "less than optimistic forecast" were a slowdown in microcomputer sales, lack of electronic mail connectivity standards and "prohibitive costs" that are not justified by the services' capabilities.

Market is slowing down

AT&T spokesman Barry Campbell admitted to having "heard rumors that the electronic mail market is slowing down." Campbell added that he expected AT&T Mail's ease-of-use features to overcome any general market trend.

Representatives of two

See AT&T page 13

"We just installed some high-speed super-minicomputers from Harris."

"The fast track just got faster."

FOR YOUR INFORMATION,
OUR NAME IS
HARRIS

High Speed Super-Minicomputer Systems
Data Processing
Networks
Telecommunications

HARRIS

VAX
Financial Software

COLLIER JACKSON, INC.
We bring software to life

813-872-9990
3707 West Cherry Street, Tampa, Florida 33607

DEC
RENT, BUY, UPGRADE OR SELL

NEW AND USED DEC SYSTEMS & ADD-ONS

- Excellent Product Quality & Equipment Pricing
- Extensive VAX® & PDP-11® Inventory



BROOKVALE ASSOCIATES...Our 12th Year

WEST COAST 800-251-6700 EAST COAST 800-545-1167
206-481-2929 516-273-7777

TWX 510-226-7315

NEWS

AT&T E-mail hit soft mart

From page 12

AT&T Mail beta test sites, Macy and Black & Decker Manufacturing Co., agreed with Campbell. Macy, which became an AT&T Mail subscriber in October, had become dissatisfied with the telex system used to connect its New York headquarters with import/export branches in Asia.

"Telex is 1920s technology," a Macy spokesman said last week. "It's slow — up to 300 bits/sec." It's blind: You get no acknowledgment of transmissions. An electronic mail service allows us to move messages at rates of up to 1,000 bits/sec."

Macy opted for the AT&T Mail's IBM Personal Computer software, the spokesman said, because "It employs a very, very simple approach. It does a lot of work for the user. Other vendors offer software, but it isn't as friendly."

The company discovered that the service provided the ability to tie in directly with local electronic mail systems running on Unix, the same as the AT&T 32B. This feature allows subscribers to use their in-house IBM Personal Computers or 32B minicomputers in combination with the service.

Macy has installed 32B mail centers in Hong Kong and at its New York headquarters. Messages are sent from remote sites to mailboxes on AT&T Mail premises, where they are automatically forwarded to the recipient's mailbox on the in-house 32B.

Connection to U.S. mail services

AT&T Mail held several attractions for Black & Decker. "It is priced competitively. We liked the fact that we could use AT&T Mail to transmit binary files generated by Lotus or Multimate and the connection to the U.S. mail services for hard-copy delivery," said senior planning analyst William Thompson. "But other services provide that, so I guess the bottom line was that it was the easy-to-use software."

Black & Decker installed a 32B minicomputer at its Towson, Md., headquarters. The 32B runs Private Message Exchange (PMX), a Unix-based electronic mail system. Electronic mail sent to mailboxes on the AT&T Mail system is automatically forwarded to the 32B, where it is picked up by users in locations all over the world.

The company currently uses telex to communicate with remote locations in 40 countries overseas, but it is gradually replacing the telex links with connections over Tymnet/McDonnell Douglas Network Systems Co.'s Tymnet packet-switching service. In the meantime, AT&T Mail provides a telex gateway to the remote sites.

In-house voice/data system

The appliance company's long-term goal is one in-house voice/data mail system, which means gradually phasing out AT&T Mail service while retaining the easy-to-use communications software and 32B mail centers. Thompson said large companies are most likely to form transitory relationships with the service.

AT&T Mail's Unix connection fits in well with Black & Decker's plans

to gradually move more and more messaging traffic onto its internal networking system, which is based almost entirely on AT&T digital private branch exchange equipment.

"With PMX and the Tymnet overseas links we expect to save \$500,000 to \$1 million in communications costs by early 1987," Thompson said.

According to Campbell, large businesses constitute AT&T Mail's primary market. "We are aiming the service primarily at Fortune 500 corporations that have multiple sites and need to communicate with other businesses."

AT&T's strategy has a good chance of success, according to Walter E. Ulmer, president of Walter Ulmer Consulting of Houston, Texas. "I think AT&T Mail is a strong, competitive, feature-rich product which will be helped by the fact that AT&T is al-

Public electronic mail services 1984-1990			
	Messages per Year (in millions)	Revenues (in millions)	Percent Increase in Revenues
1984	95	\$ 200	-
1985	140.4	300	50
1986	209.3	450	50
1987	307.3	630	40
1988	450	882	40
1989	616.9	1,191	35
1990	815	1,548	30

Source: LBN Research Inc.

ready strong in the medium-size and large company market. It is not interested in selling electronic messaging

to John Q. Public but to corporations with whom it is developing long-term business relationships."

**UNIX & C
HANDS-ON SEMINARS 1986**

A Complete Curriculum for: End Users - Management - Applications Staff - Technical Support

COURSES	LONDON	BOSTON	CHICAGO	DALLAS / SAN FRANCISCO	LOS ANGELES	FIRE ISLAND	NEW YORK & BROOKLYN	TORONTO & ORLANDO	WASHING- TON, D.C.	EUROPEAN SEGMENT	TUTORIAL
UNIX Fundamentals for Their Programmers*	Jan 14-18 Jan 15-19 Jan 17-20 Jan 18-22 Jan 19-23	Mar 16-20 Mar 17-21 Mar 19-23 Mar 20-24	Mar 11-15 Mar 12-16 Mar 13-17 Mar 14-18 Mar 15-19	Jun 26- 28 Jul 2-4 Jul 3-5 Jul 4-6 Jul 5-7	Mar 11-15 Mar 12-16 Mar 13-17 Mar 14-18 Mar 15-19	Feb 4-8 Feb 5-9 Feb 6-10 Feb 7-11 Feb 8-12	Feb 5-7 Feb 6-10 Feb 7-11 Feb 8-12 Feb 9-13	Jan 29-31 Feb 1-5 Feb 2-6 Feb 3-7 Feb 4-8	Jan 29-31 Feb 1-5 Feb 2-6 Feb 3-7 Feb 4-8	Jan 14-18 Jan 15-19 Jan 16-20 Jan 17-21 Jan 18-22	\$225
UNIX Fundamentals for Programmers*	Jan 13-17 Jan 14-18 Jan 15-19 Jan 16-20 Jan 17-21	Mar 11-15 Mar 12-16 Mar 13-17 Mar 14-18 Mar 15-19	Mar 12-14 Mar 13-17 Mar 14-18 Mar 15-19 Mar 16-20	Feb 25-27 Mar 1-3 Mar 2-4 Mar 3-5 Mar 4-6	Mar 12-14 Mar 13-17 Mar 14-18 Mar 15-19 Mar 16-20	Feb 17-19 Feb 18-22 Feb 19-23 Feb 20-24 Feb 21-25	Feb 18-22 Feb 19-23 Feb 20-24 Feb 21-25 Feb 22-26	Feb 25-27 Mar 1-3 Mar 2-6 Mar 3-7 Mar 4-8	Feb 25-27 Mar 1-3 Mar 2-6 Mar 3-7 Mar 4-8	Jan 20-24 Jan 21-25 Jan 22-26 Jan 23-27 Jan 24-28	\$280
Small Computer Languages*	Jan 11-15 Jan 12-16 Jan 13-17 Jan 14-18 Jan 15-19	Apr 3-6 Apr 4-7 Apr 5-8 Apr 6-9 Apr 7-10	Mar 20-21 Mar 21-25 Mar 22-26 Mar 23-27 Mar 24-28	Feb 6-7 Feb 7-11 Feb 8-12 Feb 9-13 Feb 10-14	Mar 20-21 Mar 21-25 Mar 22-26 Mar 23-27 Mar 24-28	Feb 13-14 Feb 14-18 Feb 15-19 Feb 16-20 Feb 17-21	Jan 23-24 Jan 24-28 Jan 25-29 Jan 26-30 Jan 27-31	\$125			
C Language Programming*	Jan 24-28 Jan 25-29 Jan 26-30 Jan 27-31 Jan 28-31	Apr 1-5 Apr 2-6 Apr 3-7 Apr 4-8 Apr 5-9	Mar 21-25 Mar 22-26 Mar 23-27 Mar 24-28 Mar 25-29	Feb 10-14 Feb 11-15 Feb 12-16 Feb 13-17 Feb 14-18	Mar 21-25 Mar 22-26 Mar 23-27 Mar 24-28 Mar 25-29	Feb 13-14 Feb 14-18 Feb 15-19 Feb 16-20 Feb 17-21	Jan 27-31 Jan 28-31 Jan 29-31 Jan 30-31 Jan 31-3	\$1225			
Small Programming	Jan 22-26 Jan 23-27 Jan 24-28 Jan 25-29 Jan 26-30	Apr 1-5 Apr 2-6 Apr 3-7 Apr 4-8 Apr 5-9	Mar 11-15 Mar 12-16 Mar 13-17 Mar 14-18 Mar 15-19	Feb 7-8 Feb 8-12 Feb 9-13 Feb 10-14 Feb 11-15	Mar 11-15 Mar 12-16 Mar 13-17 Mar 14-18 Mar 15-19	Feb 13-14 Feb 14-18 Feb 15-19 Feb 16-20 Feb 17-21	Jan 16-17 Jan 17-21 Jan 18-22 Jan 19-23 Jan 20-24	\$490			
Using Advanced UNIX Commands*	Jan 29-31 Jan 30-31 Jan 31-3 Feb 1-2 Feb 2-3	Apr 10-14 Apr 11-15 Apr 12-16 Apr 13-17 Apr 14-18	Apr 9-13 Apr 10-14 Apr 11-15 Apr 12-16 Apr 13-17	Feb 18-21 Feb 19-23 Feb 20-24 Feb 21-25 Feb 22-26	Apr 9-13 Apr 10-14 Apr 11-15 Apr 12-16 Apr 13-17	Feb 17-19 Feb 18-22 Feb 19-23 Feb 20-24 Feb 21-25	Jan 16-17 Jan 17-21 Jan 18-22 Jan 19-23 Jan 20-24	\$1725			
UNIX Internals	Apr 26-28 Apr 27-29 Apr 28-29 Apr 29-30 Apr 30-31	Aug 1-5 Aug 2-6 Aug 3-7 Aug 4-8 Aug 5-9	Aug 9-13 Aug 10-14 Aug 11-15 Aug 12-16 Aug 13-17	Feb 24-27 Feb 25-29 Feb 26-30 Feb 27-31 Feb 28-31	Aug 9-13 Aug 10-14 Aug 11-15 Aug 12-16 Aug 13-17	Feb 14-17 Feb 15-19 Feb 16-20 Feb 17-21 Feb 18-22	Jan 12-13 Jan 13-17 Jan 14-18 Jan 15-19 Jan 16-20	\$1,375			
UNIX Administration*	Feb 12-14 Feb 13-15 Feb 14-16 Feb 15-17 Feb 16-18	Apr 1-5 Apr 2-6 Apr 3-7 Apr 4-8 Apr 5-9	Apr 20-24 Apr 21-25 Apr 22-26 Apr 23-27 Apr 24-28	Feb 24-27 Feb 25-29 Feb 26-30 Feb 27-31 Feb 28-31	Apr 9-11 Apr 10-14 Apr 11-15 Apr 12-16 Apr 13-17	Feb 18-21 Feb 19-23 Feb 20-24 Feb 21-25 Feb 22-26	Jan 6-10 Jan 7-11 Jan 8-12 Jan 9-13 Jan 10-14	\$1,375			
Advanced C Programming Workshop*	Feb 19-23 Feb 20-24 Feb 21-25 Feb 22-26 Feb 23-27	Aug 1-5 Aug 2-6 Aug 3-7 Aug 4-8 Aug 5-9	Aug 28-32 Aug 29-33 Aug 30-34 Aug 31-35 Aug 32-36	Mar 10-13 Mar 11-15 Mar 12-16 Mar 13-17 Mar 14-18	Aug 10-13 Aug 11-15 Aug 12-16 Aug 13-17 Aug 14-18	Aug 28-32 Aug 29-33 Aug 30-34 Aug 31-35 Aug 32-36	Mar 10-11 Mar 11-15 Mar 12-16 Mar 13-17 Mar 14-18	\$490			
Advanced C Programming Workshop*	Mar 5-9 Mar 6-10 Mar 7-11 Mar 8-12 Mar 9-13	Aug 1-5 Aug 2-6 Aug 3-7 Aug 4-8 Aug 5-9	Aug 28-32 Aug 29-33 Aug 30-34 Aug 31-35 Aug 32-36	Mar 10-13 Mar 11-15 Mar 12-16 Mar 13-17 Mar 14-18	Aug 10-13 Aug 11-15 Aug 12-16 Aug 13-17 Aug 14-18	Aug 28-32 Aug 29-33 Aug 30-34 Aug 31-35 Aug 32-36	Mar 5-9 Mar 6-10 Mar 7-11 Mar 8-12 Mar 9-13	\$1,325			
Berkeley Puzzles, Games and 'Cheat' Shell*	Mar 12-16 Mar 13-17 Mar 14-15 Mar 15-16 Mar 16-17	Aug 12-16 Aug 13-17 Aug 14-15 Aug 15-16 Aug 16-17	Aug 5-9 Aug 6-10 Aug 7-11 Aug 8-12 Aug 9-13	Mar 23-27 Mar 24-28 Mar 25-29 Mar 26-30 Mar 27-31	Aug 12-16 Aug 13-17 Aug 14-15 Aug 15-16 Aug 16-17	Mar 23-27 Mar 24-28 Mar 25-29 Mar 26-30 Mar 27-31	Mar 11-15 Mar 12-16 Mar 13-17 Mar 14-18 Mar 15-19	\$1,325			

*Includes hands-on training workshops

*UPX is a trademark of Bell Laboratories

†Savings for consecutive seminar dates

Call for details on:

- On-Site Seminars
- Video-Based Training
- Interactive Video-Training

Whether you are training 2000, 200, or two ... you can select the most efficient and economical training solution for your unique environment.

To reserve your seminar space now, or for your free 48-page course catalog call (800) 323-UNIX or (312) 987-4084.

COMPUTER TECHNOLOGY GROUP

Technologies, Inc.
310 S. Michigan Ave., Chicago, IL 60604
The Leading Independent UNIX System
Training Company

Borland enters AI arena with Turbo Prolog development tool

Kahn says product to spur use of AI

By Peggy West

SCOTTS VALLEY, Calif. — Borland International, Inc. plans to announce today Turbo Prolog, its first venture into the artificial intelligence arena. The announcement will be the first in an expected new family of products, including both development tools and application programs with AI features.

Borland President Philippe Kahn last week said Turbo Prolog is "a complete, interactive development system" that will help spur widespread use of AI, especially with its \$99.95 price.

Borland's version of Prolog is a declarative language with a true incremental compiler that generates native code and linkable object modules compatible with an IBM

PC-DOS linker, according to a Borland spokeswoman. If the compiler detects an error and stops in progress, it will position the cursor at the error in the source code, she said.

The language also supports full 32-bit memory addressing, offers an interactive full screen editor and includes pull-down menus with graphics and text-based windows and on-line Help. The software will run on the IBM Personal Computer and compatible systems and is scheduled to be available April 25.

Kahn said Turbo Prolog represents Borland's "new generation of compilers," which support modular programming and can exchange programs with other versions of Borland's cornerstone product, Turbo Pascal, is due out before the end of the year and will be able to exchange some information with Prolog, Kahn said.

Kahn predicted Turbo Prolog will outsell its Pascal predecessor, which the company reports has sold some 500,000 copies. Other language products are forthcoming, including versions of Basic, Modula 2 and C.

Kahn said he expects new Borland applications will come with applications in Turbo Prolog and feature such artificial intelligence characteristics as natural language query capabilities and expert system shells. Another Borland product, the Turbo Lightning reference library, is well suited to interfaces built with Turbo Prolog, he added.

Kahn said Borland's internal test surpassed execution speeds of 100,000 logical inferences per second, a standard of measuring an AI development tool's speed.

Louis Robinson, editor of "The Spang Robinson Report," an AI newsletter in

Palo Alto, Calif., commented that there is "still some question whether microcomputers can use the full power of high-level languages" and that the new product's execution times "sound pretty outrageous" but could depend on the applications.

Hans Neumann, editor of the "AI Trends" newsletter from DM Data, Inc. of Scottsdale, Ariz., pointed out that Prolog "is one of the newer languages and not the kind most people are used to using."

Neither are Prolog-based

products abounding. Industry watchers cited only a few young developers. Logicware, Inc. of Toronto recently released an upgraded Microsoft Corp. MS-DOS version of its \$495, 2-year-old M Prolog, which includes a compiler and interpreter for larger systems. Microprolog from Programming Logic Systems of Milford, Conn., is a \$295 package that has been available for more than a year. A handful of smaller firms offer more limited Prolog interpreters.

\$249.TERMINAL



Featuring • Standard RS-232 Serial Asynchronous ASCII Communications
• 48 Character LCD Display (2 Lines of 24 each)
• 128 x 128 Resolution (8x8 dot matrix graphics)
• Ten key numeric array plus 8 programmable function keys
• Four-line alphanumeric readout
• Auto-dialing and remote control via telephone line
• Solid 1.625" W x 6.75 D x 1.77 H, Weight 1.25 lbs.
• 5 1/2" 3.25" 5.25" 3.5" 5.25" 3.5" -base rates, parity, etc.
• 80 x 24 Character ASCII Set (upper and lower case)
• Continuous scroll feature, 100 character scroll loop 10.

COMPUTERWISE, INC.
302 N. Winchester • Olathe, KS 66062 • (913) 829-0600 • TELEX 70637

TSO
SUPERSET-UTILITIES
IS THE
BEST ALTERNATIVE
TO IBM

- COPY
- COMPARE
- FORMAT
- HELP
- LIST
- LIST/JES
- MERGE
- PRINTDS
- TSO SORT
- Full Edit Support
- User Exit Facility
- 120 Column Support
- JTFP Interface
- Powerful Syntax
- Horizontal, Vertical
- Word Processing Features
- Converts TSO Help to Full-Screen
- File Listing for Full-Screen or Line Terminals
- SYSTOUT Previewer (JES2 & JES3)
- Powerful Syntax
- Full-Screen Selection Menu
- Full-Screen Sort Parameter Menu

Write or Call for Details.

Applied Software, Inc.
840 U.S. Hwy. #1, Suite 250
North Palm Beach, Florida 33408, (305) 434-4818
OVER 400 TSO CUSTOMERS WORLD WIDE

800-343-6474

Hard as we try to give our readers the most complete information available, some good news and feature stories never reach us.

Are you involved in an unusual application of data processing technology in your company? Have you implemented successful cost-cutting strategies?

Is something in your DP shop not working as designed? Heard any hot news about vendors?

If so, we would like to hear from you.

Computerworld has established a reader hot line for information regarding items of interest to the computing community. Call us toll free at (800) 343-6474. Ask for Peter Bartolik, news director.

We can't be everywhere—but our readers are.

"Barton, the computer terminals are still down!
Where's the service rep?"

"Stuck in Osaka
by a typhoon. We should've gone with Harris."

FOR YOUR INFORMATION,
OUR NAME IS
HARRIS

HARRIS

Boeing schools AI talent

From page 1

which they came.

Now the graduate associates become AI ambassadors, implementing their program projects in the workplace and sharing their new techniques.

Boeing's associates program is comparable to a graduate program in artificial intelligence theory and methodology, says Janusz S. Kowalki, manager of technology transfer and dean of Boeing's professional institution of higher education. Pairing the Boeing Computer Services program with a university's curriculum and actually awarding graduate degrees is a future possibility; but Kowalki stresses that Boeing Computer Services graduates enjoy a position that is more immediately valuable to themselves and their employers than if they earned AI degree status.

Changing lives

"We are giving these people a unique background. We are changing their lives and their life opportunities," Kowalki says.

"AI is not a thing, it's a way of thinking about problems," chief scientist Wilson notes. "Rather than thinking about everything as a program, we think about it in declarative programming."

Associates take classes in logic, symbolic relationships, AI programming languages and other topics related to their fields of interest. The latter includes knowledge engineering, natural language, automated programming and robotics, particularly computer vision and speech recognition.

The associates' term projects are part of their application for admission to the program, which receives inquiries from about 40 employees in a year, although it can accommodate only 20 in the two classes scheduled each year. A new session begins every six months at Boeing's Belview headquarters, and the program draws from among a total of 106,000 employees throughout Boeing's 15 major sites in the U.S. and Canada.

Academic background

Strong computer science background is a requisite, though the associates' academic backgrounds may be as diverse as their interests and pay scales, said Richard A. Escobedo, AI specialist and an instructor in the associates program.

"Competition is getting stiffer. The project descriptions are getting more complex and better written," according to Escobedo.

The first class of asso-

ciates, graduated in February 1985, is just now beginning to see the fruits of its AI methods in the original departments. "It usually takes a year before an application can be made real," Kowalki notes.

One member of that first class is William J. McClay, who returned to his post at Boeing Computer Services' support group for Boeing Electronics with the new title of knowledge engineer. He returned, McClay recalls, brimming with ideas for a new knowledge base system to help the organization for connector assembly. "You're talking about process specs 20,000 pages long, 2,000 of which are just about connectors," he elaborates. "New employees are overwhelmed. We're building a knowledge base system that answers questions about specs. It's a tool to use the job."

The program asks questions in six different languages, eliciting the answers with tables and rules McClay built and can recommend parts and action in about 60% of the day-to-day situations in the electronics shop. The program is written in Prolog, runs on a Digital Equipment Corp. VAX machine and employs natural language techniques to facilitate ease of use. McClay's program is still a prototype, but the engineering shop is doing an evaluation, and the author hopes it will be certified and released in limited production versions by May.

Applying AI techniques

"Technology transfer is what this is about," McClay says of the associates' program experience. Despite its being "tough to go back and be an associate again," McClay envisions enormous possibilities in applying AI techniques to everyday work.

"At the beginning of the course you wonder how all of this is going to change your programming," McClay recalls. "Then three or four months later you're saying, 'Now I realize how important this is to me and I have to make my management realize it so we can do some really interesting things.'

"You learn to attack the problem differently," McClay says. "It's not the tool, it's the technique and methodology that make a difference." The intensity of the relatively short course is a challenge, he adds. "A lot of professors sitting under the tree and pondering it for a while."

Describing the ideal candidate for the program, McClay says that Boeing Computer Services must "pick a person who not just is willing but is dying to do this, because those first few weeks are 60-hour weeks. You have to want it badly." A project may not get to

the point of a sophisticated prototype, Escobedo adds. "The hope is that they will go back and, with the funding and support of their home organization, will complete it."

Another recent graduate associate, Dan Kaiser, developed a program to monitor space-station cabin environments and investigate causes of change, reacting to them differently as needed instead of simply turning up the heat when the temperature drops. While on loan to NASA's Marshall Astronautics and Space Administration, that project isn't for Boeing to implement on its own.

Other projects

Chief scientist Wilson says other recent associates' projects include a knowledge base/experiment system for airplane part design management, a knowledge base and one to determine air resistance and help the aerodynamicist define and evaluate parameters.

"Some will be successful, some won't," Wilson adds. "If 75% are, it's worth it."

Kowalki stresses that progress is slow, is rewarding. "One of the problems the world at large has with AI is that too much is expected too fast," he notes. "I try to warn that there is great potential, no question, but these results are not going to be obtained too soon or at low cost."

The program has drawn interest of competitors and customers, Escobedo says.

"The Air Force is very interested. NASA is extremely interested in regard to the space station."

Visiting scholars welcome

Visiting scholars are invited to speak as part of an ongoing colloquium, which is open to other interested AI center employees, according to Escobedo.

Boeing Computer Services' Education and Training Division has also added

several courses in AI methodology and programming languages to its general schedule, open to all employees.

"Every year, we have 20 more projects applying artificial intelligence methodology to our current problems," Wilson notes. "In the '60s, centralized computing was the focus. We try to provide the new technology push. We want to have the tools ready."

BECOME A VSAM EXPERT.

SysEd's new 5-day VSAM course will make you a VSAM expert. You'll not only learn how VSAM works, but how to make it work well, and what to do if things go wrong. Even if you're already using VSAM, you'll gain a better understanding of its concepts and flexibility. And like to know how to select among the options VSAM offers for configuring disk sets, both batch and on-line?

Our hands-on case study instruction begins the first day. You'll write and test three real-life programs and use Access Method Services on our own 4341/11 computers. There are eight 3270 terminals dedicated to the lab. You'll receive individual attention from our experienced teachers, and you'll want to bring your actual programming and debugging problems to class.

SysEd's VSAM course contains the most up-to-the-minute information available anywhere, including the latest features and capabilities of VSAM, and is in line with state-of-the-art developments.

SysEd courses are held weekly and on weekends at our training centers in New York City, Chicago, San Francisco and Dallas. On-site courses at your own computer installation are also available. Classes are limited. For early enrollment or more information call Dave Shapiro (212) 584-8147.

SYS-ED

26 West 35th St. off Fifth Ave., New York, NY 10001

"Just thinking about office automation
gives me a headache."

"Take two aspirins and call
Harris in the morning."

FOR YOUR INFORMATION,
OUR NAME IS
HARRIS

HARRIS

VIEWPOINT

EDITORIAL

The slow road to standards

A computer manager from a major North-eastern financial institution stood before a throng of computer industry leaders recently and pleaded, "We need standards to do our jobs. Even transient standards."

When computer users begin to plead for transient standards, you know it is time for vendors to pay attention. Or else. Information processing is a growth industry and the portion where corporate users are willing to indulge vendors is that still clinging to proprietary architectures. Users not only refuse to truck with such vendors, they possess the technological wherewithal to produce effective homegrown alternatives when vendors won't budge.

Vendors sense the currents flowing, of course. They have, accordingly, made "connectivity" 1986's first semi-official industry buzzword. And several have come together in an organization called the Corporation for Open Systems (COS), which is designed not to set standards but to establish testing procedures whereby products can be measured against standards set by other organizations — such as General Motors Corp.'s Manufacturing Automation Protocol.

The COS concept is a good and potentially useful one. For COS to achieve its potential, however, user corporations must join its ranks en masse to influence the organization's drive for responsible standards. Last week's organizing meeting saw two user corporations sign on with COS, while others were in action with a growing, but otherwise unorganized, feeling that the potential benefits of shaping COS policies and priorities are worth the same price: \$25,000 dues.

As a vendor-created trade organization, COS confronts the usual risk of being dominated by vendors rather than users. With users represented deep inside the organization, this is less likely — though not, certainly, impossible. We can only hope that users and vendors alike will recognize, and act to realize, COS' potential to achieve more than transient standards.

Notes & observations

Hats off to all those toiling in engineering laboratories and corporate boardrooms who made those much-discussed reduced instruction set computers (RISC) a reality. True innovation is the kind that refuses to accept the basic notion that the rules for computer architecture are cast in stone — always its applause.

Last week Hewlett-Packard Co. took RISC innovation up a new path when it became the first manufacturer to expand an existing family of commercial products with RISC machines — machines that are designed to be compatible with existing traditional architecture products.

True innovation also spawns controversy, and this is no exception. There are those who claim that RISC systems will be inflexible, more suited for research than commercial use and outdated by the time they become mainstream. And, indeed, these critics may be correct.

For now, though, we think a word of praise is in order for those at HP and elsewhere who have expanded the dialogue in a critical area of computer technology.



News item: Soviets gain access to Western data bases, including technology research.

LETTERS TO THE EDITOR

Star Wars technology not bug free

Praise of the presumed "Impact of Star Wars on MIS" [CW, Feb. 10] is highly disturbing. The Reagan administration seems to see that war and peace require human, moral and economic solutions, not technical ones.

There may indeed be many benefits from holodeck systems — though that is debatable — but Star Wars is not required for their development. Let's peg Star Wars for what it is: a vastly expensive, militarily destabilizing program. It is of a complexity that defies thorough debugging. It is not suitable for a live test, and it is only able to address a part of the nuclear threat — not cruise or submarine-launched missiles. This technology is certain to spur a new round of offensive weapons development.

We in the computer industry should have a clear understanding of the difficulty in ascertaining the reliability of complex systems and, therefore, have a responsibility to represent this understanding to the public in regard to Star Wars.

I challenge those who agree with this thinking to find peaceful programs that will spur the same levels of research, perhaps in international communications and education or in energy development and delivery.

Why can't these powerful and exciting new technologies be used to bring the world together, fostering understanding and cooperation rather than driving a larger wedge in an already dangerously fragmented global society?

Daniel A. Coleman
Data processing manager
The Village Cos.
Chapel Hill, N.C.

Forced compatibility vexes vendor

In the article "Microsoft MS-DOS strategy features Windows way of life" [CW, Feb. 10], I find it hard to believe that Microsoft Corp. has the gall to try and force third-party software developers into Windows compatibility. The consequence of not being Windows compatible, we are told, is that we may find our programs no longer compatible with MS-DOS.

I've heard good things about Windows, but I'm hardly anxious to jump on the bandwagon with a gun to my head, especially when the product was announced two years before it was released. This

does not inspire confidence.

Microsoft should take a long, hard look at what happened to them with its Topview product. IBM, too, made the tactical error of telling third-party vendors that IBM had the total environment.

Microsoft should stick to what it knows — writing operating systems. What the world, and third-party software developers, really need is a bug-free version of MS-DOS. That would really surprise us. Microsoft and its egocentric view of the world is, perhaps, the best argument for Unix.

Michael Ceranski
Vice-president
Sophco, Inc.
Boulder, Colo.

AT&T Unix standard in circulation

We would like to thank Computerworld for its coverage of the Uniform Show in the article "Unix use still in development" [CW, Feb. 10]. We take exception, however, to the assertion that there is still no Unix standard.

The industry has adopted the Unix/group standard as a foundation for Unix development. AT&T has acknowledged the importance of standardization and has stated that System V is upwardly compatible with the Unix/group standard. The X/Open Group, a consortium of major European computer manufacturers, also incorporated the standard in its Unix specification.

The Unix/group has passed standardization efforts in the Institute of Electrical and Electronics Engineers, Inc.'s P1003 Committee.

One other minor correction: This was not the first time that IBM exhibited at Uniform. The company has been at the show since 1984.

Joseph Reilly
Executive director, Unix/group
Uniform program chair
Santa Clara, Calif.

Computerworld welcomes letters and publishes those it judges of greatest interest to its readers. Preference will be given to typed, double-spaced letters of fewer than 150 words. Letters become the property of Computerworld and cannot be returned for revision or credit. Letters should be addressed to the Editor, Computerworld, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-0171.

WEEKLY.



Things have a way of changing rapidly in the computer business. Like yesterday. And that's why COMPUTERWORLD comes to you weekly. Get 51 issues for just \$38.95. Plus 10 issues of COMPUTERWORLD FOCUS for news analysis all year long.

COMPUTERWORLD

Keeping Up With Today. Anticipating Tomorrow.

VIEWPOINT

Solving the user-programmer conundrum

By AMY D. WOHL

Ask any end user what he wants out of his company's computers, and you'll hear some variations of the same three answers to business problems. Users don't want programs and data; they want results.

But applications development contains a classic computing problem: Only the user knows what he wants, and only the programmer knows how to make it happen. Because users and programmers don't speak a common language, the near-perfect communication needed to describe a complex, detailed project is difficult, if not impossible.

Every computer professional has heard those tired, old jokes about how the user can never tell anyone exactly what he means, needs or wants. And every end user knows the experience of waiting months — or years — for his application program to be completed, only to find that it's not at all what he had in mind.

This problem has led to an adversarial relationship — with programmers seen as aloof, uncommunicative idiots rather than professionals whose competence is in an area other than computing, and with end users sure that programmers don't live in the real world at all.

Bridging the gap

The profession of systems analysis was designed to bridge this gap. The idea was to train a professional who is knowledgeable in what computers can do and who is able to speak the programmer's jargon in order to talk

to and translate for end users.

Nonplanned iterative design, writing and rewriting programs to make them — in the end — do what the users wanted, is a process costly in time and in scarce and expensive programming resources. Real iterative design, with the user involved in program specification so that little bits of the program are written and rewritten through user and programmer interaction with or without a screens analyst, is very expensive.

Enter Dan Bricklin's Demo Program. Bricklin is the inventor of VisiCalc, and he had the whole idea of the spreadsheet as a business metaphor. His first company, Software Arts, Inc., died in the messy disagreements between Software Arts, VisiCalc's inventor and engineer, and VisiCorp, its marketer. His new firm, Software Garden, is intended to offer tools at prices low enough to make them widely usable.

Bricklin's Demo Program supports an interactive design process in which end users, systems analysts and programmers can collaborate in producing usable programs more quickly and with less wasted work than ever before.

The clever program runs on an IBM Personal Computer and permits any analyst, programmer or computer-literate end user to create screens that look exactly like programs for data entry, data query, data manipulation and analysis or report output without writing a line of code.

Bricklin's Demo Package is full of tricks to make the interface rich, quick and simple. And changing the screen with the user looking over the analyst's shoulder, saying, "That's not exactly what I had in mind," is very easy, too, with visually oriented tools that let you move and size boxes, change text and so forth. Series of screens can be "run," making them look like a fully functional program.

With the price of Dan Bricklin's Demo Package at \$75, we would expect every data processing sys-

WOHL STREET MINIJOURNAL



Programmers are sure that end users are idiots, and end users are sure that programmers don't live in the real world.

tems with applications programs that emphasize user involvement in the design vs. programmer-intuited applications programs makes us feel strongly that user involvement is a requirement for user acceptance. Therefore, we strongly urge the use of an iterative, user-involved design model as often as possible.

Note that iterative design is not new, and Bricklin's Demo Package is not the first prototyping package around, but consider the following:

- Iterative design without a supporting environment is expensive. It requires both patience and a high degree of skill on the part of users and analysts or programmers and a com-

munity to throw out software until the design of the software is acceptable to both user and analyst.

- Bricklin's Demo Package is certainly the least expensive prototyper currently available, allowing end-user organizations to distribute it broadly.

- The package is extremely easy to use, permitting many end users to speed up further the design process by creating their own programs as part of a specification document for the systems analyst or programmer.

- We expect to see this program all over the place — and very quickly. And that will bring up another interesting issue: Could Bricklin be one of the few people to bring a second, entirely separate and different, highly successful Personal Computer software package into the world? So far the list of such successes is short indeed.

- Clearly, Microsoft Corp. has done well with sellers like MS-Basic, MS-DOS, Multiplan and Word. But even mighty Lotus Development Corp. has stumbled on a second real winner: Nothing at Lotus has yet equalled its standard bearer 1-2-3. Certainly not Symphony or Jazz. And one could, with justice, argue that these were mere extensions to 1-2-3 and not separate and different products.

- Bricklin's TK Solver was really an advanced and very special kind of spreadsheet and far too specialized to enjoy broad market success, so it doesn't count. But Demo Package could do the trick.

- Now if Bricklin would only write the next program — one that takes those lovely screens and automatically generates the software to make them happen. But that will likely need artificial intelligence, automatically connected data bases, much good luck and even more time.

The war of the words

By NILAKANTAN NAGARAJAN

The word "acronym," according to Webster's *New Collegiate Dictionary*, is a word formed from the initial letter or letters of each of the successive parts or major parts of a compound term.

A suave sales representative or a persuasive professional takes extreme delight in dropping such acronyms, as if they were an indication of his mastery of the state of the art or as a protective shield to score one against an opponent in the war of the words. A naive reader of a computer magazine will be awed by the barrage of such a baffling array of acronyms.

IBM is a household word, but I was amused to see that WNCD (Webster's *New Collegiate Dictionary*, of course) defines it as an intercontinental ballistic missile.

Nagarajan is an assistant professor of information systems at Fordham University in Bronx, N.Y.

CHIPS will be immediately recognizable by many people as the popular TV series on the California Highway Patrol. But how many professionals associate the term with Clearing House Interbank Payments System — an electronic funds transfer system among banks?

CED is usually recognized to refer to the chief executive officer of an organization. Now, however,

CBO represents Comprehensive Electronic Office, a product developed by Data General Corp. to support word processing, file management, spreadsheets, graphics and data base management.

Likewise, everyone understands the term AFL-CIO, the major trade union organization, though one may not know its expansion as Congress of Industrial Organizations. But CIO in modern computer jargon stands for chief information officer.

With the rapid strides of computer technology, some acronyms are used

for different concepts or entities over a period of time. Sometimes, however, they have different meanings during that same period, which causes confusion.

For example, CAI was used to represent computer-aided instruction, but nowadays it may mean computer-aided imaging or even the name of a particular firm.

CAD is usually used to mean computer-aided design, but it also stands for computeraided drafting or documentation either alone or in combination as CADD.

IC stands for — or should I say, stand for — integrated circuit. But it is also associated with information center and intelligent chip. RAF can be recognized especially by the British as the Royal Air Force, but it is being used now for remote access facility in DP parlance.

MRP is coined to represent material requirements planning, but when we found that the acronym for manufacturing resource planning

would conflict with MRP, we had to be content with MRP II for the latter.

Attractive acronyms

Acronyms are useful if formed with intelligence and humor or as a target for the product in the market. Most programming languages and software packages derive their names from attractive acronyms, but the practice may tend to become self-defeating if used ad nauseum. A non-technical novice user or reader may be bamboozled by a plethora of purposeless acronyms.

MUPS, humorously enough, represents the multiprocessing system that was developed originally for medical information in hospital management.

STD, is commonly associated with the word "standard." But the dictionary states that the term designates a doctor of sacred theology. I could not contain myself, however, when an article referred to STD as an acronym for sexually transmitted disease — a chief factor behind the epidemic of infertility in the U.S.

READER'S PLATFORM

By ROBERT L. STONE

Editor, *Computerworld*

It's been a while since I last

had a chance to write a column

about the reader's platform.

So here goes.

First, I'd like to thank all

the readers who have

written to me over the past

few months. Your letters

have been a great source

of information and ideas.

Second, I'd like to thank

all the readers who have

written to me over the past

few months. Your letters

have been a great source

of information and ideas.

Third, I'd like to thank all

the readers who have

written to me over the past

few months. Your letters

have been a great source

of information and ideas.

Fourth, I'd like to thank all

the readers who have

written to me over the past

few months. Your letters

VIEWPOINT



**TURNAROUND
TIME**
Larry Long

Q Recently, we adopted a rather liberal microcomputer acquisitions policy. The way the policy is written, almost any microcomputer would be acceptable. We would like to amend the policy to identify acceptable micros by their manufacturers and models.

In the past, we haven't been very successful in our selection of micros. Half of our current inventory is made up of micros made by companies that have gone under. Do you have an insight as to what microcomputer manufacturers will re-

main and thrive during the next five to 10 years?

Perhaps I can give you some food for thought. It's no secret that the future is not in single-user, stand-alone micros. Successful micro companies will focus on products that support microcomputer networks, multiuser capabilities and micro-mainframe links. Those continuing to emphasize single-user, stand-alone operation may be in trouble.

I would anticipate that IBM clones will continue to offer alternatives with inviting price-performance ratios. In fact, IBM allows them. Clone manufacturers are at the mercy of IBM planners. Should IBM choose to do so, it could make life very difficult for manufacturers of IBM clones.

During the last three years, a few companies have introduced what I

would call truly innovative microcomputers, but they have experienced only marginal success in the fickle micro market.

Several very large and established companies may swim in red ink for the next few years, but they will survive. Small companies unable to absorb losses while continuing their research and development efforts may be in for a rough ride. The great micro shake-down will continue for at least a couple of years.

Q During the next 12 months, we will purchase and install about 50 microcomputers. We've selected a vendor and made all of the configuration decisions except one. We are divided as to whether to configure the micros with color or monochrome monitors.

We have authorization to spend the extra money if we determine that the color monitors will be of value to our users. These micros will be distributed throughout our 10 user departments. We anticipate that each will run a variety of commercial software packages.

Given our situation and the trends in software support for micros, are you pro or against color or monochrome monitors?

Only a handful of microcomputer software packages make effective use of color. However, I sense that software vendors are beginning to pay more attention to the fact that the added dimension of color makes for a more efficient interaction with the system. Software development and enhanced versions of existing software that are planned for release in 1986 will undoubtedly be designed to make effective use of color.

I have talked with many users who have exposure to both color and monochrome monitors, and their overwhelming choice is color. I recommend the color monitor not because the display will be more visually appealing but because of its ability to enhance user friendliness and information dissemination.

Q A three-member executive committee, of which I am a member, has been formed to select a successor to the retiring director of our corporate computer center. We are currently reviewing resumes of applicants. The successful candidate will take charge of a department with more than 55 people and a budget in excess of \$6 million.

We are looking for someone with proven management abilities and are testing applicants from accounting, engineering, manufacturing as well as data processing backgrounds. One of the candidates looks very promising. His experience with computers is as a long-time user of DP services. Do you think a good manager with no firsthand DP management experience can manage a large data processing department?

In theory, excellent managers should be able to apply their skills and make the most effective use of available computing resources. In practice, good managers with limited technical expertise often fall short of expectations. The resources available to an MIS manager are people, procedures, hardware, software and data. To tap the full potential of these resources, the successful manager must understand them, including the capabilities and limitations of hardware, software and support tools. A manager that does not have a solid technical base can fall behind very quickly in such a rapidly changing environment.

I'm not saying that a former user can't become a good MIS manager. What I am saying is that the person making a successful transition must be well equipped to manage all of the resources, not just people.

Larry Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 9171, Framingham, Mass. 01701-9171.

FARSIGHT "SHOCKS" THE INDUSTRY WITH \$1000 WORTH OF SOFTWARE FOR \$99.95. DON'T BELIEVE US?



JUST ASK THE FRANKLINS.

SPREADSHEET, WORD PROCESSOR, WINDOWS, \$99.95. Introducing Farsight. The first truly integrated spreadsheet, word processor and window manager priced to put a jolt into the competition. Because \$99.95 delivers a 1-3-3-like spreadsheet, a high-end full-featured word-processing system and an expandable window manager. Systems that purchased separately would easily cost \$1,400.00.

LIKE 1-3-3, ONLY BETTER. Farsight's Spreadsheet is everything you've heard about 1-3-3 plus some new highlights. And you'll find it's up to Farsight today without any down time. New editing 1-3-3 data files are read directly, plus keyboard and menu-driven macros are fully supported. You won't even have to re-learn your commands. So your investment in 1-3-3 data and procedures is not lost. Easy enough.

WORD PROCESSING + SPREADSHEET, TOGETHER AT LAST. Farsight's Word Processor combines all the features contained in the leading high-end products with the ease of use typically found in entry-

level systems. But the real spark in your word processing productivity comes from Farsight's multiple user-defined windows. You can virtually open as many document or spreadsheet windows as you wish and can't move text from one to another. With as little as six keystrokes.

BANK SOME BENS WITH FARSIGHT. Ben Franklin, that is. About nine of them. And that's just the value built into Farsight. Feature-rich software that's going to change the way the industry computes up its bottom line. And today. We'll ship you Farsight and our \$99.95 page manager within three days of your phone order. And if you don't agree that Farsight is the best value on the market, we'll send you your money back.

**NON COPIY-PROTECTED,
MONEY-BACK GUARANTEE.**

FARSIGHT

From Interface Technologies Corp.
333 Richmond, Suite 200, Houston, TX 77006

1-800-922-9049

In Texas, call (713) 462-7000. Mon.-Fri., 8:00-5:00
For outside Texas, call 1-800-922-9049. Mon.-Fri., 8:00-5:00
Holidays 1-800-922-9049. U.S.A. 417-656-1333

PARTIAL FEATURES LIST

Farsight's Spreadsheet: Data Manager
 All spreadsheet/data manager features of 1-3-3 Rev. 1A
 Multiple windows, templates fully supported
 1-3-3 file read/write, an index supporting
 Spreadsheets comparable to or better than 1-3-3 Rev. 1A
 1-3-3 file save and load features
 Screen matrix reducing 100x13 Rev. 1.0
 Can search for values and labels
 2400 rows x 250 columns

Farsight's Word Processor

Full editing with insert or overwrite modes
 Multiple windows, templates within a document
 Decimal tab
 Search and replace backward or forward
 Cut, Copy, Paste
 Undo/revert, understanding, justification, italic, page formats indicated on screen
 Find function and macro support
 Print headers and footers
 Multiple leaders and footers
 Soft hyphenation

Farsight's Window Manager

Allows any combination of windows and word processing windows with full 1-3-3 page integration
 Full color control system help
 Full reports subroutines. (1-3-3 copy, move, delete, etc.)
 Over 1000 windows
 Over 2000 regular windows
 Background printing
 Can have multiple printers on one machine
 Can have multiple Farsight applications on one memory available
 User assignable keys for all applications
 Can receive messages from the keyboard

You must be _____ region of Farsight. We're enclosed 100.00 for each copy plus \$7.00 shipping and handling. In Texas, add \$4.00 make up U.S. postage and handling for non-residential customers.

Check Money Order
 M/C VISA MasterCard

Credit Card # _____

Expiration Date _____

Signature _____

Street _____

City _____

State/Zip _____

Day Phone _____

International orders add \$20 shipping/handling. If paying by check, check or draft must be in U.S. dollars drawn on a U.S. bank.

INTERSTATE TECHNOLOGIES CORPORATION
333 Richmond, Suite 200, Houston, TX 77006
(713) 656-1333

CPW

COMMUNICATIONS



Cultivating the hybrid network

FIRST OF TWO PARTS

What is meant by a hybrid telecommunications network? Essentially, it is a flexible or open network concept that takes advantage of a number of different technologies or media or even contractual arrangements. Out of all these pieces a unified network can be built.

There are at least five ways that a network can be built in a hybrid manner:

- Carrier- and customer-provided facilities.
- Carrier- and customer-based network switching, intelligence and control.
- Dedicated trunks, such as leased lines and switched public dial-up lines.
- At the media level, most especially terrestrial and satellite. Even within terrestrial, fiber optics can be combined with microwave.

At the applications level, with voice, data and image transmissions sharing various kinds of wideband facilities like T1.

There are several driving forces causing user companies to implement hybrid telecommunications networks. In the first place, they usually build a network for a specific purpose — to support bank tellers or airline reservation clerks, for instance.

But three recent trends have been moving companies toward hybrid networking. First, the large companies keep growing and finding new applications that can be automated and networked cost-effectively. They build

See CULTIVATING page 22

McQuillan is president of McQuillan Consulting Co., Cambridge, Mass.

DEC advances toward OSI

VAX, Microvax software implements transport layer

By Elisabeth Horwitt

MAYNARD, Mass. — Demonstrating its embrace of the Open Systems Interconnect (OSI) networking standard, Digital Equipment Corp. recently announced software that implements the transport layer of the seven-layer model on DEC's VAXes and Microvaxes running the VMS operating system.

Available immediately, the VAX OSI Transport Service (VOTS) is priced at \$1,200 for Microvax 4/32K for VAX 11/730 through 11/790 and \$16,000 for an 8650. The product enables in-house programmers and software developers to write program-to-program interfaces for two systems that use the OSI transport layer protocols, said David Korf, multivendor interconnect marketing manager for DEC's networks and communications division.

"With this announcement, DEC has started to fulfill the commitment it made last June to migrate from the proprietary Digital Network Architecture (DNA) to OSI," Korf added.

So far, according to Korf, DEC is the only computer vendor that has implemented the OSI transport layer worldwide. IBM's Open Systems Transport and Services Support (OTSS) software, which implements OSI Layers 4 and 5 on IBM 370/VM systems, will soon be available, but only in limited areas, he said.

Korf admitted that VOTS will remain of limited value to users until other vendors come up with their own Layer 4 implementations. But, he added, this should happen quickly. "The computer companies that have joined Corporation for Open Systems realize that if they don't implement OSI they'll be locked out."

The February announcement is part of DEC's three-year plan to implement all seven layers of OSI. Korf said nothing definite about the vendor's final plans, but

See DEC page 22

NEW THIS WEEK

- Cincom Systems enhances Net/Master
- Northern Telecom offers its Intelligent Matrix 3000 Switch

■ For more on these and other new products, see pp. 67-85

INSTANT ANALYSIS

"One plus for a large company doing business with AT&T: You get to preview new products before they come out. We've given input in AT&T communications products like System 85, Starlan and Audit. You'd never catch IBM doing that; we read about their new products in the newspapers."

— Wayne Thompson, senior planning analyst, Block & Decker, Inc., during an interview

DG package allows MV/Eclipse communications in SNA nets

By Dennis Reimondi

WESTBORO, Mass. — Data General Corp. recently unwrapped a communications software package that allows DG computers to communicate with each other in an IBM Systems Network Architecture (SNA) communications environment.

The Xodis Transport Service/SNA (XTS/SNA) Backbone communications software package integrates DG's Xodis networks with IBM's SNA networks. The software, which costs from \$800 to \$5,400, depending on CPU size, supports the DG Eclipse MV family of minicomputers.

The new product should find a market among the IBM shops that want to integrate DG's distributed processing systems into their SNA networks, according to John McCarthy, research manager at Forrester Research, a Boston-based market research and data base company that focuses on Fortune 1,000 companies.

McCarthy added that XTS/SNA Backbone will allow IBM sites to replace their IBM 3270-type terminals or IBM Personal Computers with more intelligent DG terminals or with DG computers.

MV/Eclipses traditionally communicate through Data General's X.25 packet-switched network, Xodis. XTS/SNA takes packets generated by an MV/Eclipse computer and adds code so that they can be transmitted over an SNA network, according to DG's Joe Clabby, product manager for IBM compatibility products.

The product requires no additional wiring on the existing network. No DG software needs to be installed on an IBM host.

SNA network customers will be able to use DG products such as Comprehensive Electronic Office System (CEO) software without adding new network schemes, according to Clabby. "IBM customers don't want to install duplicate networks," he

See COMMUNICATIONS page 22

AT&T cuts ribbon on Accunet T45 fiber-optic 'freeway'

By Edie Goldberg

BASINGSTOCK, N.J. — Last week AT&T Communications added a 45M bit/sec. digital communications channel to its Accunet family of packet-switched transmission services. The Accunet T45 service will initially be available in 37 cities located along AT&T's fiber-optic routes.

The company said that the service will expand to new fiber-optic links as installations are completed that by the end of 1989 its fiber-optic network will include 130 U.S. cities.

The 45M bit/sec. "freeway" is broken down into 28 T1 (1.544M bit/sec.) "lanes." "The service offers economies of scale to companies with

five to eight T1s that connect the same two points," said Grant Herrel, project manager for Accunet T45 service. He added that exact cost benefits depend on actual distances and differences in geographic location but that, generally, a customer would get about three times the capacity for the same price as five to eight separate T1 lines.

AT&T said the new service targets Fortune 500 corporations, government agencies, telecommunications vendors and other organizations that regularly transmit large volumes of voice, data and image traffic along multiple T1 lines.

Randall Sherman, vice-president of communications at Creative Strat-

egies Research International, San Jose, Calif., said he foresees a narrow market for the T45 service primarily as a "carrier's carrier." He explained that "45M bit/sec. is an awful lot of capacity for a single company. The main market will almost likely be large users and communications vendors that purchase T45 as a backbone and resell T1 channels to customers."

Sherman added that the high-speed data communications market is already crowded with satellite, microwave and fiber-optic-based transmission services. "I don't expect a heavy demand for T45 links between the two coasts, because satellite links are more competitive at distances

over 1,000 miles. But for intercity communications, T45 can make sense," he said.

Customer costs for the T45 service are broken down into three parts: the basic fiber-optic channel for 45M-bit transmission between AT&T central offices, a 45M-bit central office connection and an optional multiplexing function to allow customers to divide each Accunet T45 into as many as 28 1.5M bit/sec. circuits.

In one example of pricing provided by AT&T Communications, a customer who chooses a five-year, fixed-rate plan for service between Philadelphia and Hartford, Conn., will pay \$33,245/mo plus \$1,700/mo for each optional multiplexing function.

Achieve Full Integration For Your Corporate PC... With The SAS System Under PC DOS.

One Integrated Solution For All Your Company Needs.

Now, you can have an information system that offers solutions for all of your company's needs. Data management and retrieval. Statistical analyses. Report writing. Applications development. And

more. All in one product.

And you can use it in every department and for every application. Data entry. Business reports. Text processing. Statistical summaries. With the PC SAS® System, decision-making, record-keeping and analysis are standard and simple.

One Solution With Complete And Powerful Features.

The same high-quality software for mainframes and minicomputers is now available for PCs. And it offers features as rich as any mainframe system you've seen. A data manager. A full-screen text editor.



dBASE II and dBASE III are trademarks of Ashton-Tate. This and 1-2-3 are trademarks of Lotus Development Corporation.

A windowing facility. Complete data manipulation and statistical procedures. A display manager (to edit, display and control output from your PC). An interactive programming facility. A front-end menuing system that you can customize. With the PC SAS System, you get the power of the mainframe and minicomputer SAS System. And more.

One Solution For Your Micro-To-Mainframe Link.

Now, you can link your PC to your mainframe. With the same system at both ends of the link. You can download data to your PC. Or develop and test applications on your PC. The PC SAS System reads data from programs like dBASE II, dBASE III and LOTUS 1-2-3. You can enter data on your PC, submit your job to the mainframe, execute it, and view the results on your PC. Or you can download data from the mainframe, add and

analyze, and send the new data to the mainframe for job execution and storage. Regardless of which system you use, the language syntax and commands are identical.

One Solution That Is Remarkably Friendly.

Now, one system offers special features like programmable "pop-up" windows that make "friendly" a term you can understand. Use these windows to program function keys. To create "help" messages. To check the variables in your data set. And these windows can handle practically any utility you need. In fact, the PC SAS System is so friendly anyone in your organization can use it.

One Solution With Site Licensing And Full Support.

At last, you can have the information system for your PC you've always wanted. With the advantages of site licensing. You

license the PC SAS System on an annual basis. You get all updates automatically. And at no additional cost.

The PC SAS System is also fully supported. Documentation accompanies delivery. Technical support is provided by phone or mail. Full customer training is offered. And it's all available from SAS Institute.

The Solution For SAS Power On Your Corporate PC. Now.



SAS Institute Inc

Box 8000, SAS Circle

Cary, North Carolina 27511-8000

Telephone: (919) 467-8000, ext. 280

Telex 802505 SAS RAL



COMMUNICATIONS

Cultivating the hybrid network

From page 19

more and more networks until they are left with an unmanageable mess that includes dozens of data networks and often voice, facsimile and video networks as well. Hybridization — putting more than one application or type of transmission on the same physical lines — is one way of making the mess more manageable.

Another core issue is that there has been a shift in attitudes. Managers are now thinking about networks that do more than replace people with machines. They want networks that increase revenue as opposed to cutting costs, that enhance the over-

all competitive position of the company, that increase market share or customer loyalty, and that facilitate new lines of business or new kinds of service. Now they are treating networks as a corporate resource and as a long-term investment toward both known and unanticipated uses and benefits.

Need for open-endedness

Those types of networks must be able to expand to meet unanticipated needs. They must be open-ended for future applications.

I have one client, for instance, who is bringing in a private packet network so that every terminal and computer can have connectivity with everything else in the company. The client is not sure of who will need connectivity or when or how, but he knows that connectivity will make it

easier to do business better.

A third force behind the hybridization trend is the expansion of network services beyond the traditional boundaries of the corporation to include customers, suppliers, dealers, agents and so on.

As long as a company keeps its net within corporate boundaries, it retains total system control from the top down. It can choose what kinds of protocols to use and where to install the lines and terminals; it knows where everything is.

But if a company wants outside links to independent agents or dealers or suppliers — and most especially to customers — it does not have that control, that knowledge, and a hybrid network makes sense because it is flexible enough to deal with the different kinds of circumstances found outside the company walls.

DEC advances toward OSI

From page 19

admitted, "We're climbing up the OSI tower, so the next step is obvious."

That is likely to be Layer 5, which defines how sessions are established and controlled between two communicating computers.

DEC OSI front-runner?

David Terrie, president of Boston-based Newport Consulting and editor of The Seybold Group's new publication, "Network Monitor," questioned whether DEC is the front-runner in the race to implement OSI.

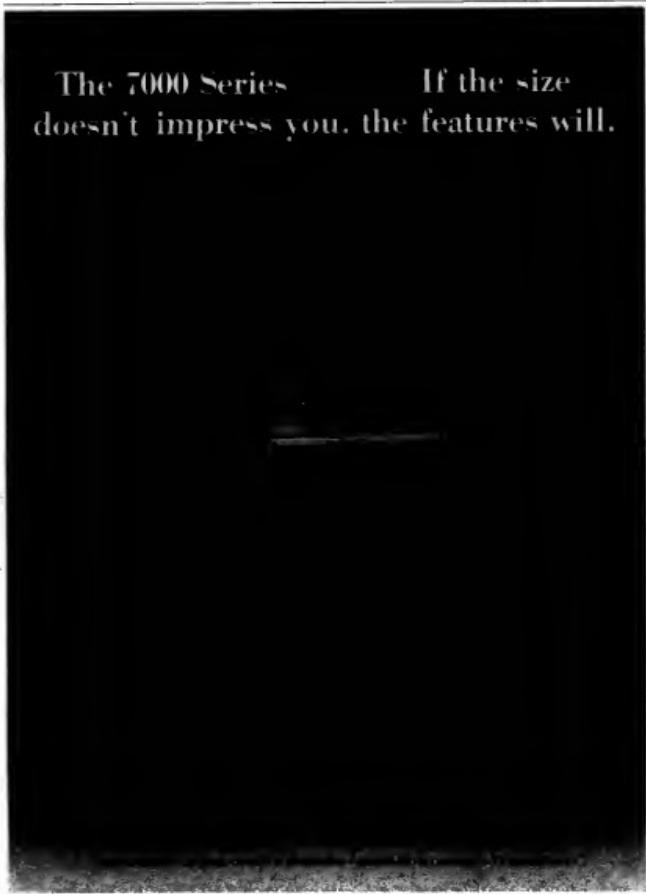
"Hewlett-Packard [HP] is the most recent networking software release to use the OSI transport layer. In fact, HP's network architecture is ISO," Terrie said.

"DEC has a huge installed base of companies committed to DNA, and DNA has a huge number of features that may or may not translate to OSI. DECnet and IBM's Systems Network Architecture are the only two de facto standards that are likely to stand out from the system level, aside from Netbus for IBM PC networks," he added.

Korf hedged when questioned about DEC's willingness to conform to other manufacturers' high-level communications protocols — IBM's Document Interchange Architecture/Document Content Architecture, for example. "There are several possibilities, including our own and Wang Laboratories," he said.

He also said that DEC's three-year plan is for DNA to be compatible with, not replaced by, OSI. "We won't give up DNA's added functionality. Users can choose between the two or implement them both on the same network."

The 7000 Series If the size doesn't impress you, the features will.



Communications tool out from DG

From page 19

said, "but I think they are starved for good, solid processors in the departmental range."

Alimed at European customers

CEO Document Exchange V1, announced yesterday, is aimed at Data General's European customers.

The hardware and software product allows CEO office automation system users to send messages, documents or charts directly from their workstations to other terminals throughout the world via public nets that use CCITT's Teletex standard.

The document exchange is supported under DG's AOS/V8 operating system and requires the 15,000 DG Teletex Adapter Unit model 6554.

The product costs from \$750 to \$4,500, depending upon CPU size.

Cabby expects the product to be used primarily in Europe at this time, because the U.S. has not yet accepted the Teletex standard.

He predicted, however, that the Teletex standard will be accepted in the U.S. within three years, because it uses faster transmission rates and a wider character set than Telex yet costs less.

MICROCOMPUTERS



SMALL TALK
Eric Bender

Glory days & DP demands

For the first time, I think, we all understand what's going on. That's better than when the company is growing at 60% to 70%, and we don't know what's going on.

Such was Apple Computer, Inc. Chairman John Sculley's capsule summary of the industry at last month's Personal Computer Forum in Phoenix.

Sculley arrived at the forum in a white stretch limousine, and a retinue of busy aides, but he didn't seem to be having quite as much fun as most other attendees. And many sounded if they disagreed with the second part of his assessment fondly recalled the glory days of early 1985.

The forum also spotlighted the widening gulf between two extremes of microcomputing — its truly "personal" computing roots and large corporation information processing — personified, respectively, by Philippe Kahn, Borland International, Inc. founder, and Robert Berland, IBM's director of strategic planning.

Kahn, who arrived on the heels of a USA Today interview in which he spoke disparagingly of the conference, cheerfully told a well-worn verbal bombshell throughout the sessions. At one point, sitting next to Ashton-Tate President Edward Eshier, Kahn bluffed software price drops on "software companies going public" — at the end of the quarter they want to make their numbers." Eshier replied smugly that "it's a competitive way to use a distributor's credit line on your product."

Kahn also remained on the scene to discuss his recent successes for his firm's profit-oriented strategy. The most recent, Berland has sold 200,000 copies of the Reflex data analysis package, presumably making Reflex one of the top five micro data base management system offerings of all time.

IBM's Berland seized the moment to deliver a series of minilectures on the need to educate users and to provide them with smoothly integrated software. "We've heard about hardware, software, firmware and vaporware, but what we ought to be focusing on is userware," that invisibly ties functions together, he declared.

Pushing this metaphor to its limits — or beyond — Berland called for "cooperative processing, with transparent underway between two consenting applications." He also underlined the requirement this move will create for strategic alliances between vendors and concluded with an aphorism to developers: "We need you badly."

"You may need us badly, but the problem is we don't need you badly," responded one software developer who

See GLORY page 24

RAM graphics tool debuts

Graphs created from on-screen applications

By Douglas Barney

GREENWICH, Conn. — New England Software last month introduced Graph-in-the-Box, a \$97.60 application claimed to be the industry's first random-access memory (RAM)-resident graphics program. The product enables users of IBM Personal Computers and compatibles to create charts and graphs from any on-screen application in 5 seconds, company President Alf Petersen said.

The package's residence in RAM allows users to call it up and create graphs without swapping disks, exiting the current application or creating intermediate files. Graphs can be generated from any application, including spreadsheet, data base or word processing programs.

Graph-in-the-Box can be called up with a single keystroke. The user defines the

area of the screen to be graphed, and the product then captures data from the screen and transforms it into a column chart that is already scaled and labeled.

Users also can use an icon menu to choose a variety of chart forms including bar, stacked bar, column, stacked column, line, step, scatter, pie, max/min and exploded pie in a variety of colors and textures. The process can produce up to 500 observations and 15 variables. Once the chart has been formed, users can change captions and titles, fill patterns, add gridlines or change the scaling.

The product works with all major graphics display boards, laser and dot matrix printers and Hewlett-Packard Co. and compatible plotters. It also runs concurrently with other RAM-resident programs.

Graph-in-the-Box requires 128K bytes of RAM and does not require color graphics. The program is copy protected and one user's copy can be made. A non-copy-protected version for site licensing is expected shortly.

CD-ROMs to expand desktop use

By Eric Bender

PHOENIX — Compact disk read-only memory (CD-ROM) players, which industry analysts James Fons and Bill Trued, Inc., call "a free gift from the consumer electronics industry to the computer industry," will support radically new desktop applications, software luminaries agreed at the Personal Computer Forum.

Along with the ability to store roughly a thousand times the capacity of today's floppy disk drives, CD-ROM players "allow you to browse that data in so many ways," commented Microsoft Corp. Chairman William Gates. He added that "the applicability to the office environment is not clear" and gave an estimate of 10 percent among business desktops by 1990.

Among the likely consumer possibilities are a multimedia encyclopedia that would provide a combination of textual, graph-

ics, video and audio information. This week at its CD-ROM conference in Seattle, Microsoft plans to give away disks demonstrating some examples.

At last month's forum, Activision Corp. Chairman Gary Kildall and Borland International, Inc. President Philippe Kahn also spoke enthusiastically about the promise of CD-ROMs.

Borland originally became interested in the technology during development work for Turbo Lightning, Kahn said. "By the end of the year, we will have several releases of CD-ROM products."

Earlier this year Kildall's start-up began selling the first CD-ROM consumer product — a player bundled with an electronic version of Grolier's Academic American Encyclopedia. Kildall commented that "if people don't like encyclopedias, they

See CD page 24

Laser printer add-on for Displaywriter unveiled

By Peggy Watt

SANTA CLARA, Calif. — Advanced Technologies International, Inc. has announced an add-on intended to let the estimated 400,000 IBM Displaywriters still in use take advantage of laser printer technology.

The Laserprint 800 connects directly to the standard Displaywriter printer port, emulates the IBM 5120 daisywheel printer and communicates with the Canon U.S.A., Inc. LBP-8 laser printer, according to President Ray Newstead. The system costs \$4,995 with controller and laser printer, with optional feeders for envelopes or additional pages.

As with standard Displaywriters, only three word processors can share a printer, but future Advanced Technologies International products will expand that capacity, Newstead said.

The laser printer's increased text capabilities, such as added fonts, reverse or shaded print and graphics, can now be used by Displaywriters with embedded text commands.

"IBM is not supporting the Displaywriter with gateways to new technology, which gives us the opportunity to come in and add value," Newstead said.

DCA upgrades Irma File transfer, keyboard enhanced

By Rosemary Hamilton

ALPHARETTA, Ga. — Digital Communications Associates, Inc. (DCA) said it has expanded the capabilities of both its Irmalink PT/3270, a file transfer program that allows the local board to interface with the IBM 3270 PC File Transfer program, and its Irmalink/3270 keyboard, a compatible keyboard that combines IBM 3270 keys with IBM Personal Computer keys. Both products sell for the same price as the older versions.

Irmalink PT/3270 now supports IBM's Personal Services/PC (PS/PC), a software product that links to IBM's Distributed Office Support System, allows communications with other PS/PC users and supports certain word processing programs. The PS/PC support requires 320K bytes of internal memory, an Irma board cost \$115 for a single user, \$2,500 for a single-host and \$7,500 for a multihost environment.

The Irmalink/3270, which sells for \$329, now includes support for the IBM Personal Computer AT. Upgrades to the Irmalink/3270 are free to customers who have a single-host or multihost license.

Bender is Computerworld's senior editor, microcomputers.

NEW THIS WEEK

- Sintec offers an IBM Personal Computer XT-compatible system
- Compucorp introduces the Connection workstation
- For more on these and other new products, see pg. 67-88

INSTANT ANALYSIS

Will Compaq Computer Corp. introduce an Intel Corp. 80386-based system before IBM? "We don't know the answer. . . . We're not waiting for IBM on anything."

— Red Canion, president, Compaq

MICROCOMPUTERS

Glory days and DP demands

From page 23

had heard enough about large corporations needs for one week. Camilo Wilson, founder of Lifetree Software, Inc., emphasized that many developers would rather concentrate on stand-alone personal computers.

Corporate Software, Inc. Chairman Mort Rosenthal asked Berland why IBM would not have put itself, as Big Blue's players, more programmers than the entire personal computer industry. "Yes, but you've got to look at strengths," Berland replied, to widespread laughter.

Also at the forum, Microsoft Corp. gave another example of the growing

split between personal and corporate computing.

Microsoft flying high

Founded by minors, Microsoft now is flying high as its initial public offering approaches. But developers are complaining that the software powerhouse has begun to make a few too many power plays. They mentioned one case in particular: To create applications for future Microsoft MS-DOS machines, the company suggests that developers work within Windows standards, which basically means you have to buy the firm's languages.

Some other notes and quotes:

- Emerging communications standards such as IBM's LUS 2 attracted some discussion, although Compaq Computer Corp. President Rod Canion cautioned that "in the world of

today, they don't really exist."

While a call for hands among software engineers currently working on LUS 2 products drew few responses, Lotus Development Corp. Chairman Mitchell Kapoor said that did not indicate a lack of interest. "It's just a bit premature," he said.

However, Tom O'Leary, director of MIS technology at North American Philips, commented that "I don't think it's premature; I think it's hard. If any of you are not thinking about interactive processing, your worth to us is short term."

• "I don't think U.S. businesses are as concerned about buying non-IBM PCs as they were two or three years ago," O'Leary stated. "We're acquiring more and more non-IBM PCs, and price is not the reason."

He listed three main reasons: good relations with vendors, better price/

performance and "finally, and the most important, we don't like the terms and conditions from IBM."

• "IBM has an invention that allows us to attack ourselves, and it's called an independent business unit," remarked W. Frank King, group director, IBM advanced engineering system development. The latest such "attack," the RT Personal Computer, was the subject of much speculation at the forum.

With its IBM logo, advanced technology, Unix-based software and Personal Computer AT-standard bus, the RT PC represents "an opportunity for the store channel to move upward," proclaimed Alan Hald, chairman of Microage Computer Stores, Inc.

Whether the RT PC will accomplish that, King remarked, its performance definitely will move upward "an order of magnitude faster over time."

• Despite some advice that artificial intelligence technology is more likely to flavor current applications than replace them, Daniel Bricklin, author of Lotus Development Corp.'s VisiCalc, suggested that such a concept is misleading for some emerging software categories. "That's sort of like thinking about building a hamburger out of Lawry's seasonings," he said.

From a computer retailer's point of view, IBM's moves to slow dealer expansion and to crack down on the gray market "are too little, too late," said Computerland Chairman Edward Faber. "There will not be fewer distribution channels for the product. There will be more; they'll just be unauthorized.... Was this all part of a plan, or was IBM incredibly stupid? IBM's not stupid. Look at the results."

• Last year Lotus was approached by literally a thousand software firms wanting to be acquired, venture capitalist Ben Rosen commented.

WANG SOLUTIONS

WANG NETWORKING. BECAUSE THERE'S ALWAYS MORE THAN ONE WAY TO GO.

A computer network in a law office is quite different from a computer network in a university or a multi-national bank. And in time, all three of those networks will be different from what they are today.

That's why you need a network—that's flexible enough to accommodate a wide variety of needs. And to change when those needs change.

You can get that flexible network from Wang.

A FLEXIBLE FRAMEWORK.

Wang Systems Networking (WSN) is more than a product or a group of products. It's a flexible framework that lets you integrate data, text, image, and messaging. From PC to mainframe. From one end of your organization to the other.

And because it's modular, WSN allows you to tailor your network using a variety of peer-to-peer transports—including WangNet, Wang's local area network, and switched or dial-up telephone lines—as well as international protocols such as X.25.

ALL SYSTEMS GO.

Although you may prefer Wang applications and systems, these systems often have to communicate with systems from other manufacturers. And with its open



architecture, WSN is flexible enough to operate in a multi-vendor environment.

For example, Wang systems can provide connectivity to IBM's SNA environment by emulating particular IBM systems such as the 3274 and 3777 Controllers. And the same is true in the world of PBX. In fact, we've already made compatibility agreements with AT&T, Northern Telecom, Mitel, GTE, InteCom, Jstel and Siemens.

Wang also offers you gateways to other applications environments. These include gateways from the Wang VS to PROFS and DISOSS, IBM document exchange products, and to AT&T's UNIX environment.

CALL FOR THE WANG SOLUTION.

The Wang Systems Networking story is an extensive one. And it's all described in a 36-page booklet entitled *Wang on Networking: Integrated Solutions for Business Communications*.

For your free copy, call us today at 1-800-225-9264.

WANG

CD-ROMs to expand micro use

From page 23

probably won't like anything." He also predicted that on-line data services "aren't going to last a long time when CD-ROMs come in, at least as far as historical data is concerned."

While there is much talk about CD-ROM standards, many are already in place, these developers pointed out.

"The things we need standards on are optical format and the video image formats on disk," Gates said.

Kildall noted that CD-ROMs lack an industry standard for file formats. "But because it's read only, it's not really imperative that we get this today.... As far as the consumer is concerned, there is no problem at all."

CD-ROMs originally were based on audiotrack technology that had been optimized for sequential access. Kildall predicted that drives will evolve into two types, divided by price and performance.

Another critical factor is copyright protection. "Book publishers are really scared; it's understandable," Kahn said. "They've got their entire data base on a disk that could go to Taiwan," Kildall commented.

Why do our customers
choose Data Design
financial software systems
over the three
largest vendors?



Because they did their homework. They talked to our customers and found out that for over 12 years, hundreds of Fortune 1000 companies have had exceptional results from financial software systems by Data Design.

They discovered what nationally recognized software surveys confirm year after year: that Data Design has an unsurpassed record of user satisfaction.

They learned they can expect fast, trouble-free implementation with our systems.

They were told that our systems are exceptionally flexible and easy to use.

They found out about our reputation for in-depth training and responsive, knowledgeable support.

They learned that Data Design places only management level people in customer service positions. People who average over 10 years experience—not trainees.

And more.

So, if you're in the process of doing your homework on mainframe financial software, call today for our complete customer list, and you too can hear why companies like Alcoa, Amoco Corporation, Best Buy King, Estee Lauder, May Company, Department Stores, Pittsburgh, Sherwin Williams Company, Bankers Trust Company,

Central Soya Company, Chicago Tribune, CIGNA Corporation, Federal Express, Litton, Midland Ross, Owens Corning Fiberglas, Perini Corporation, Royal Business Machines, G.D. Sears and Company, Security Pacific National Bank, Warner-Lambert Company, Zayre Corporation, Wisconsin Power & Light and hundreds of others decided on Data Design over other providers.

And find out why 65% of our customers, who previously had other vendor's systems in place, have now decided to use systems by Data Design.

To learn more about the best financial software available, call toll-free 800-556-5511 or complete and mail the coupon today.

DA DATA DESIGN
ASSOCIATES
Excellence in Financial Software.

1279 Oakmead Parkway, Sunnyvale, CA 94086
New York Metropolitan Area (203) 661-5668
Chicago Metropolitan Area (312) 310-0450

Financial Software by Data Design. Simply the best.

GENERAL LEDGER
ACCOUNTS PAYABLE
FIXED ASSETS
CAPITAL PROJECT MANAGEMENT

Please send me additional information on:
General Ledger _____ Capital Assets _____
 Accounts Payable Capital Project Management
 My send to: Immediate Short Term Long Term
 I am interested in attending a free seminar.

Name _____
Title _____
Company _____
Address _____
City, State, Zip _____
Telephone: () _____
Computer Brand _____
Model _____

CWD 1



Where IBM's
DB2 Relational DBMS
Falls Short...

Cincom's SUPRATM Soars.



SUPRA from Cincom^{*} is the all-new advanced relational data base management system that soars free from the weaknesses that continue to haunt DB2 from IBM.^{*}

Performance. Referential Integrity. Entity Integrity. Integrated 4GL. Capabilities. Implementation Ease. Redundancy Management. Dictionary Facilities. The list of DB2 shortcomings overcome by SUPRA goes on and on.

In fact, SUPRA's innovative *three-schema architecture* allows it to fly high above and beyond any relational system now on the market.

So if you're considering a relational DBMS, you really have only two choices. DB2 or SUPRA. Compare them.

You'll soon see why we're so confident in saying, "What we used to call competition, we're now calling prey."

To arrange for a SUPRA^{*} demonstration, the SUPRA PC-based Electronic Brochure, additional SUPRA literature, or the SUPRA seminar schedule, simply return this reply coupon. Or call us direct.

1-800-543-3010

In Ohio 513-661-6000. In Canada 1-416-879-4220.

Name _____
Title _____
Organization _____
Address _____
City _____ State _____
Zip _____ Phone _____

Executive Demonstrator Electronic Brochure Literature Seminar Schedule

 **CINCOM**

World Headquarters
2300 Montana Avenue, Cincinnati, OH 45211
Attention: Marketing Services Dept.

**DOS TO MVS
CA-CONVERTOR
THE COMPLETE SYSTEM
FOR TRUE CONVERSION
AUTOMATICALLY**

COMPUTER
ASOCIATES

SOFTWARE DESIGN & DEVELOPMENT

SOFTWARE & SERVICES

SOFTALK
John Gallant

Getting goods on-line on time

Last year was one some players in the large systems software industry would probably like to forget. But 1986 was also a year in which most vendors lived up to the delivery promises they made for new products.

Maybe it was user backlash to vaporware — unannounced but undelivered software. Maybe it was highly publicized instances of key vendors failing to deliver major, announced products on schedule. Whatever the reason, it seems that vendors made a real effort to ship on time the important new systems they unveiled in 1985.

Not surprisingly, IBM led the pack last year with the introduction of a variety of major software systems. And, at least according to Bill Big Blue did a pretty good job of delivering on those product promises. The Cobol Structuring Facility announced in November was delivered in January, as planned. Both artificial intelligence development tools unveiled in August — the Expert System Environment/VM and VM/Programming In Logic — were generally available according to schedule in September. Release 1.0 of CICS, promised for the fourth quarter, was available in December.

VM/XA, an IBM spokesman said, actually shipped two months ahead of schedule. The operating system was introduced in February along with the 3090 series processors and was made generally available in August. VM/Entry, also announced in February, began

See GETTING page 30

Gallant is Computerworld's senior editor, software & services.

TAB shifts development, data base to the desktop

Programmer tool mimics Cullinet's ADS/On-Line

By Charles Babcock

NEW YORK — Early users of a start-up company's programmer workspace say the product relieves contention for mainframe resources by shifting applications development tasks to a microcomputer.

The Application Builder (TAB), from Online/Dataspace Inc., a unit of Pearl Software Inc., successfully mimics Cullinet Software Inc.'s ADS/On-Line development environment on an IBM Personal Computer XT or AT, beta users say. A production version of the \$3,500 package is being manufactured and will be in the hands of users soon, according to Bruce H. Loeffel, vice-president of Online/Dataspace.

TAB was designed to generate applications on a micro that will run against Cullinet's IDMS/R mainframe data base management system after being uploaded to the mainframe. According to E. Michael Braude, director of Gartner Group, Inc.'s Software Management Strategic Services, TAB is "the first instance of a data base and application development environment being ported with reasonable completeness to the desktop."

Robert S. Perlmutter, assistant manager of technical services in New York, an early user of the product, says TAB helps reduce conflict among programmers using ITT's development mainframe. "Programmers tend to get in each other's way testing the same system . . . One problem is contention for the data dictionary," he notes.

ITT is beta testing TAB because it is eager to gain the advantages of shifting development work to micros. "If one programmer corrupts his data base in a micro

environment, it doesn't matter; the others may continue working," Perlmutter says.

Applications development can be such a resource hog that downloading the job to micro "might even delay your CPU upgrade," says Colin Moore, vice-president of Syntech, Inc., a Marine Del Rey, Calif., IDMS consulting firm.

A mainframe programmer can also develop an application for a microcomputer, download it to a TAB-running micro and process it through TAB's syntax converter. The result is an ADS/On-Line application that has been converted into a micro application, Perlmutter says. If it does not require TAB's data base management system (DBMS), it can run independent of TAB on any Microsoft, Inc. MS-DOS-based micro, he says.

The development language in TAB is in a near duplicate of Cullinet's ADS/On-Line high-level development language in TAB. Perlmutter says, "It is 99% compatible with the mainframe sys-

tem." In addition to the language, TAB has an IDMS-style DBMS with exports that allow a program to enter mapping definitions from IDMS into the TAB microcomputer environment, a data dictionary, menu-driven dialogue generator, utilities such as a text editor that supports INSERT/DELETE/CHANGE commands and a syntax converter.

The program segments are controlled by an operating system that gives the user access to IBM PC-DOS and MS-DOS functions and applications, according to company spokesmen.

The syntax converter takes TAB-developed applications code and translates it into code that can be compiled into IDMS ADS/On-Line code under IDMS utilities, Perlmutter says. TAB can also take IDMS ADS/On-Line programs and convert them

See TAB page 30

NEW THIS WEEK

- Applied Data Research upgrades ADP/PC Datacom
- NASA offers the Cerberus knowledge-based system

■ For more on these and other new products, see pp. 67-68.

INSTANT ANALYSIS

"Artificial intelligence is probably the world's most difficult technology. We don't even know what the core technology is. Today's tools are thin, weak and full of cracks."

Carl Hewitt,
professor, MIT
Artificial Intelligence Laboratory, on the state of AI

ELECTRONIC MAIL COMMUNICATION CENTER

Lightyears Ahead . . .

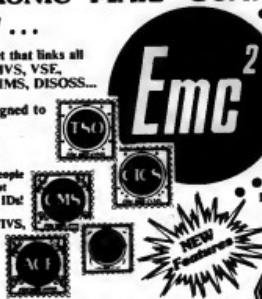
The ONE electronic mail product that links all major operating environments: MVS, VSE, VM, CMS, CICS, TSO, ACF, IMS, DISOSS...

Emc² is easy to use. It's designed to get the mail moving fast.

Emc² functions as a super-efficient ACF/VTAM application.

This allows literally thousands of people in your company to use mail without needing TSO, CICS, or CMS user IDs!

The Fischer-Innis Virtual System, FIVS, lets VM/CP installations efficiently support a very large number of Emc² users, with minimum added administrative overhead and drain on CPU and DASD resources.



- Full-screen menus and help panels
- Scrollable inboxes and outbaskets
- Uncomplicated text entry
- Mailing lists
- Bulletin boards
- Calendar features
- Timely Reminders ("tickler file" (arrange for messages to be sent at some future date))
- Automatic new-mail notification
- Mail classes (partition Emc² into virtually separate mail systems)
- Efficient data base storage
- Low administrative overhead
- Simple installation
- Application programming interface
- Electronic mail networking between mainframe sites
- Integrated PC support and integrated PC file transfer

"Re-transferrable electronic forms" — easy to create; display them, fill them out, send them.

DISOSS interface.

CALL TODAY FOR MORE INFORMATION,
OR TO SET UP A FREE TRIAL: 800-237-4510
In Florida, call 813-793-1500

475 MERCHANTILE AVENUE • NAPLES, FLORIDA 34102

SOFTWARE & SERVICES

Getting goods on-line on time

From page 29

what IBM calls a phased buildup — limited availability — in June and was made generally available in December as planned.

Only IX/370, the AT&T Unix System V implementation running under VMEbus, has slipped past the schedule that IBM outlined in its February announcement of the product. Originally slated for general availability in October, IX/370 began a phased buildup in November and is not yet generally available.

The spokeswoman would not comment on when IX/370 will move beyond limited shipments. She said

IBM still plans to deliver both IMS/VS 2.1 and DisplayWrite/370 according to schedule.

IMS/VS was promised for first-quarter 1986 availability. DisplayWrite/370 will have to be released before this piece is published in order to meet its February shipment timetable.

Meeting shipping schedules

Applied Data Research, Inc.'s Release 7.4 of Datacom/DB and its DL/1 Transparency system both went out on schedule in August. McCormack & Dodge Corp. also met shipment dates for its AR:Millennium accounts receivable system and the second version of its Millennium development environment.

Other vendors delivering on time included Prime Computer, Inc., Relational Technology, Inc. and Martin

Marietta Data Systems. Prime's Priority implementation of Unix went out to a selected group of customers in July and was generally available in November.

Relational Technology's Ingres/CMS was available in October, as planned, and Martin Marietta's Unix workstation software and Consensus development system were delivered on schedule.

CCIA rates '80-80' in delivery

Computer Corporation of America (CCA) said it was "50-50" in delivering announced products last year. Release 2 of its PC/204 product and Release 8.1 of its Model 204 data base management system were shipped as planned. But CCA is still working to get its PC/Workshop and Release 2 of its Workshop/204 products out the door.

A spokeswoman said the delays were due to time-consuming modifications to the data dictionary component of the products. Release 2 of Workshop/204 will ship by the end of March, she said, and PC/Workshop will ship by the end of April.

In the realm of integrated data center management software, Computer Associates International, Inc. made good on its summer shipment promise for the CA-Unicenter system.

Uccel Corp., which unveiled its Synova series of integrated systems software just one day after Computer Associates introduced CA-Unicenter, shipped the initial component of Synova — Novalog — according to schedule.

Although the products mentioned here are just a sampling of the major software systems introduced in 1985, it seems clear that vendors are striving to get systems out the door on time. That strategy can only build user confidence and give a boost to an industry that already has plenty of other problems to surmount.

TAB shifts development

From page 29

into TAB-recognizable code. The syntax converter follows security procedures that are compatible with IDMS and converts TAB's data dictionary entries into the IDMS data dictionary format, company officials say.

The package does not have a micro-to-mainframe link even though it is intended to shift applications between the two, Loeffel says.

A client of Symath, an IDMS user, says it plans to employ 100 programmers on a long-range development project. When Moore asked Cullinet about an IDMS programmer's workload, the software vendor responded to TAB's developer, Online/Database Software.

To evaluate its DBMS capabilities, Moore set up a stress test with 364 records, each with 5,800 elements.

Response times did vary

"TAB did not deteriorate as we were further and further down the list," establishing the data base, Moore says. "Response times did not vary much throughout the couple of seconds," he says. The test exceeded the demand that will be made on the DBMS under design for his client, he adds.

Perlmutter says his version of TAB has performed the function well on ITT Information Systems' Xtra/XP personal computer, which runs MS-DOS. He has built two test applications with TAB, one in personnel and one in inventory.

Cullinet Software officials decline to comment on TAB. A beta user who asks not to be identified says Cullinet indicated to him that it has no competing product under development.

TAB is written in the C language, and Online/Database Software officials say they plan to have Unix and Microsoft Xenix versions available later this year.

TAB can run on an IBM PC-DOS or MS-DOS compatible provided it has 640K bytes of memory and at least a 5M-byte hard disk, Loeffel says.



Design refinements cut size, cost and power consumption for 4800bps modems

Additional UDS macrominiaturization in UDS/204/VS modems has produced significant performance improvements, along with dramatic reductions in size and power consumption. These can be seen in the new UDS/204/VS, a 4800bps modem, featuring two using one dedicated lines or half-duplex on the dial-up telephone network. It is now available in a 160mm x 100mm x 30mm package. This saving in space is reflected in volume. The UDS/204/VS is also available in space-saving OEM card configurations.

DC power consumption has been reduced to approximately 2W. Other performance features include:

- Compatibility with all currently available 204s
- Full bi-directional capability - local and remote, analog and digital.
- Suitability for multi-drop applications
- Improvement in signal-to-noise performance, thanks to advanced equalizer design.

UDS modems are offered nationally by leading distributors. Call the nearest UDS office for distributor listings in your area.
DISTRICT OFFICES: Atlanta, GA 30360-5116 • Austin, TX 78744-4206 • Boston, MA 02157-1000 • Chicago, IL 312/527-1000 • Dallas, TX 75201-3000 • Denver, CO 303/777-1000 • Detroit, MI 313/962-1000 • Houston, TX 713/655-1000 • Kansas City, MO 913/235-1000 • Los Angeles, CA 404/955-0000 • Milwaukee, WI 414/765-1000 • Minneapolis, MN 612/861-1000 • New Haven, CT 203/562-1000 • New York, NY 212/592-1000 • Phoenix, AZ 602/946-1000 • Seattle, WA 206/569-1000 • Spokane, WA 509/344-1000 • Tampa, FL 813/628-1000 • Toronto, ON M3J 2M7 Canada.

Created by Designplus, Inc., Atlanta, GA, 30360.

Universal Data Systems

 UNIVERSAL DATA SYSTEMS
Information Systems Group

UDS is a registered trademark of Universal Data Systems, Inc. All other products and services mentioned are trademarks of their respective companies. © 1986 Universal Data Systems, Inc.

SYSTEMS & PERIPHERALS



HARD TALK

James Connolly

Good service, greater needs

The more you can give me, the more I want." That seems to be the finding of a recent survey on computer systems service.

It is not good enough that most large systems vendors improved their service in 1985. User expectations and demands are growing faster.

Input, a Mountain View, Calif., computer industry and telecommunications research firm, surveyed users of nine vendors' large systems. The result was Input's realization that there is a surprisingly high level of user dissatisfaction with mainframe service.

Complicating the problem is the fact that users were most dissatisfied with the highest priority service needs, such as parts availability, software and hardware maintenance and engineer skill levels.

The fact that those areas are of the highest priority should not be startling. Each of those areas is intricately related to both time and system availability.

In addition, it probably should not be surprising that users are most upset with those portions of their service.

It is problems such as a delay in the shipment of a new part or a software bug that cause an engineer that a user — as well as the user's boss — will remember. It is that type of problem that burns a hole in the manager's stomach.

The less crucial or less time-dependent services mentioned by Input's respondents included areas such as consulting, documentation and training.

Input asked users to rate services from one to 10 in terms of importance, with 10 carrying the highest priority. Engineer skills, hardware maintenance

See GOOD page 32

Connolly is Computerworld's senior editor, systems & peripherals.

By Deanne Reimondi

Reduced instruction set computers (RISC) — claimed by their designers to be at least twice as fast as conventional computers — are sprouting up in the marketplace. IBM started off 1986 by announcing its RISC-based RT Personal Computer, and Hewlett-Packard Co. last week unveiled its Spectrum series of RISC-based systems.

RISC processors are said to run from two to four times faster than conventional, complex-instruction set computers because they execute a smaller set of instructions. Their simpler architecture allows faster computing, and RISC units may also be less expensive.

But the idea of RISC is complicated, and the technology could even become obsolete before it is widely developed, a number of experts say. Experts contend that the real value of RISC to developers is that it has focused attention on instruction sets and livened the dialogue as to what makes a good set.

Many of the instructions found on a complex instruction set machine can be eliminated on a RISC system, according to Ridge Computers, Inc.'s director of CPU development, Chip Fesser. Ridge is one of the first companies to make a RISC-based line of computers. The instructions include variants of memory referencing instructions and esoteric instructions such as IBM's ZAP, which are designed for one or two specific applications, and extended precision instructions that support 128-bit words but that are rarely needed.

RISC is a better architecture for compute-bound applications than it is for transaction processing, Ridge's Fesser says. "You gain more from having reduced instructions in the transaction processing environment." The instructions are typically optimized to be completed within one machine cycle, and they operate from register to register within a CPU, accessing main memory with simple LOAD and STORE instructions. Mathematical instructions are simple, too, such as COMPARE and ADD.

RISC refers not just to the number of instructions but also to the simplified ad-

dress process for fetching instructions and operands from memory and to the simplification of complex instructions.

Variables, temporary variables and constants are stored in register stacks in the processor, thereby reducing memory use. Instructions are generally of one size, making for predictable execution times that help to maintain constant execution times and even flow in the pipeline.

RISC research started in the 1970s when IBM studies showed that the bulk of a computer's time was spent loading data from memory into registers and restoring them to memory. Studies revealed that many instructions were used infrequently.

The University of California at Berkeley developed the RISC I and RISC II projects that tried to reduce instruction sets to the minimum number needed, and Stanford University joined the RISC research efforts with an attempt to reduce pipeline contention problems. These pure RISC machines are not commercially available anywhere. To be useful, they need compilers and hardware and floating-point processors and memory management schemes.

Companies like Data General Corp. and Digital Equipment Corp. have experimented with RISC concepts and found them wanting. At the December announcement of the VAX 8650 processor, Ken Olsen, president of DEC, said the company has not been successful in making a RISC machine that is as good as its other CPUs.

The reality of RISC systems is that their perceived superiority over traditional architectures, some contend, is not as great as analysts like Will Zachmann, who follows new technology for International Data Corp. RISC systems may use simpler CPUs, but they require more complicated software and hardware elsewhere in the system, he points out. RISC-optimizing language compilers, task switching within the system and LOAD and STORE operations that RISC uses can obliterate the architecture's advantages.

See GAMBLING page 32

Floating Point enhances, expands scientific computer line

Series 64 gets Unix, C compiler, processors

By James Connolly

BEAVERTON, Ore. — Enhancing and expanding its family of scientific computers, Floating Point Systems Inc. recently announced two processors and the availability of Unix, a C language compiler and a solid-state storage device for the 64 series of systems.

The systems are the FPS-264/20 and the FPS-364/Max, which is the second Floating Point product to fea-

ture matrix algebra accelerators. Those accelerators allow matrix algebra calculations to be replicated in main memory on very large-scale integration hardware. The initial accelerator product, the FPS-164/Max, was announced in 1984 and features less memory, fewer peripherals and fewer accelerators.

The FPS-364/Max was designed for use in structural analysis, computational chemistry and physics. It supports up to eight accelerators and performs up to 187 million floating-point operations per second (Mflops). It will be available in April at a price of \$401,000 for a system with 500K

words of main memory, one accelerator, one disk drive with controller and software including the Past Matrix Solution Library.

The FPS-264/20 is targeted to various industrial, government and academic applications.

According to the company, the system has a peak performance of 20 Mflops and a base price of \$460,000. The system was designed to be upgraded to the existing 38-Mflops FPS-264. The FPS-264/20 will also be available in April.

The Unix option will provide Floating Point's installed base and new customers with an AT&T Unix

System V environment, while the C compiler is designed to provide greater processing speed and user efficiency in graphics applications and computer-aided design and computeraided engineering circuit design and testing programs.

The solid-state disk option is the company's first solid-state device. It features a memory capacity ranging from 128K bytes to 15.75G bytes with a logical disk controller and a 44M byte/sec. transfer rate.

The Unix option will be available in October, the solid-state device in November and the C compiler in November.

NEW THIS WEEK

- Harris introduces Harrisduc systems
- DEC announces Vaxlab real-time workstation
- For more on these and other new products, see pg. 67-68.

INSTANT ANALYSIS

"I think IBM decided it could not afford to lose that middle range to the minicomputer vendors." — Data Karmick, independent analyst, on the restructuring of the IBM 4381 line

SYSTEMS & PERIPHERALS

Gambling on RISC systems

From page 31

Among those who disagree with Zachmann is Robert Ragan-Kelley, vice-president of architecture and planning at Pyramid Technology Corp. Ragan-Kelley helped develop one of the first commercially available RISC-type machines. He says that with a small register set LOAD and STORE operations can minimize the advantages, but with the over-lapped registers favored by RISC developers like Pyramid, that is a fallacy, he says.

"It turns out that with the over-lapped register approach, compilers are very simple," Ragan-Kelley con-

tinues. Users do not care what the compiler looks like, anyway, he says, and the user/programmer finds that it is easier to generate code on a RISC system because there is only one way to do it. As far as task-switching is concerned, "We are trading off something that happens once in a while," he adds.

The development of software is a little more difficult in the beginning of a RISC project, Pessa says, but once compiler designers have learned to use transistor-transistor logic instead of the more expensive emitter-coupled logic on their HICX-7 computer because of the reductions in the instruction set they made after studying RISC concepts, says Lyke Pitt, HICX-7 product manager.

Harris used RISC concepts to cut a traditional DEC VAX-11/780-type operating system, with 300+ instructions, down to about 160 instructions. The resulting system is trans-

parent to the user, Pessa says.

Task switching is done for transaction processing applications and not for the compute-intensive operations that are more likely to be performed on a RISC machine, he adds.

Translator-translator logic

The benefits of the attention being given to RISC may have been lost on others. One, Harris designers were able to use transistor-transistor logic instead of the more expensive emitter-coupled logic on their HICX-7 computer because of the reductions in the instruction set they made after studying RISC concepts, says Lyke Pitt, HICX-7 product manager.

Harris used RISC concepts to cut a traditional DEC VAX-11/780-type operating system, with 300+ instructions, down to about 160 instructions. The resulting system is trans-

parent to the user, Pessa says.

Task switching is done for transaction processing applications and not for the compute-intensive operations that are more likely to be performed on a RISC machine, he adds.

Translator-translator logic

The benefits of the attention being given to RISC may have been lost on others. One, Harris designers were able to use transistor-transistor logic instead of the more expensive emitter-coupled logic on their HICX-7 computer because of the reductions in the instruction set they made after studying RISC concepts, says Lyke Pitt, HICX-7 product manager.

Harris used RISC concepts to cut a traditional DEC VAX-11/780-type operating system, with 300+ instructions, down to about 160 instructions. The resulting system is trans-

Good service, greater needs

From page 31

and parts availability all scored 8.8 or higher. More than half of Input's respondents said they were dissatisfied with those three services and with software maintenance, which carried an importance rating of 7.8.

Parts availability grew worse

A problem like parts availability grew still worse when Input looked at vendors that had recently introduced products and hurt their own logistics.

The least crucial service, consulting, earned a 70% positive satisfaction rating but only a 6.3 rating in terms of importance.

Input's conclusion was that even improvements in the low-priority areas will have little impact on the user's overall perception of service.

User dissatisfaction

Another surprise for Input was the decline in user dissatisfaction with hardware service in light of the increased reliability and system availability of large systems.

Only IBM and National Advanced Systems Corp. scored better than 50% in the area of hardware support.

Even companies that improved hardware support did not necessarily boost their overall service ratings from their 1984 ratings, and some saw their overall rating improve despite failing hardware ratings.

High-priority, high-visibility services

What seems to be clear is that vendors must recognize and must target high-priority and high-visibility services, even as less time-dependent professional and software services such as consulting and planning become more important to the user community. Input's final conclusion seems to make sense: "Successful service vendors should target specific services most likely to improve the users' overall perception of hardware maintenance."

Five-year plans for system growth will never cure the stomachache the manager gets when a serviceman leans on a dead CPU and says the new part should be in the day after tomorrow.



Best of your choices

Document Interchange +
Electronic Mail + Calendaring

Do you have dissimilar hardware, all working independent of one another? Let TOSS bring together your environment with IBM mainframe through electronic communications with document transfers. The System offers:

Document Interchange

- With IBM 8100/DOSF
- With Wang 5%
- With IBM-PC with IRMA board.
- With IBM 3270 PC.

System Features

- Short Note Facility
- Word Processing
- Electronic Mail
- Calendaring
- To-Do List
- User Directory
- User Friendly Menu Interface.
- TSO Interface.

Terminal Support

- 3270x CRTs
- 3270x Printers
- TTYs
- 3767
- IBM-PCs
- 6670 and System Printers



National Business Systems, Inc.

30 Tower Lane, Armonk Park South, Armonk, CT 06001 Tel: 203-677-8766

In England and Europe

Contact Allegro Software Products, a THORN EMI Company, Ringwood House, Watling Street, Aylesbury, Buckinghamshire HP21 7QJ, Tel: (0296) 230411, Telex: 83274

Executive Report

Edited by Janet Fiderio and Becky Batcha



INSIDE

Software tools help managers control DASD resources/34

Optical storage challenges magnetic media in micro market/36

Mainframe storage: IBM products, thin-film technology to play role in 1990/42

Minicomputer storage: intelligent devices, smaller disks to gain acceptance/44

Micro storage: Trends emphasize optical disk and increased functionality/48

Managing data storage

Ingenuity, current technology can cure I/O snags

By DONNA RAIMONDI

As computers become faster and more powerful, on-line usage grows at a rapid rate, doubling almost every two years. On-line applications require fast and frequent access to stored data, and, in a chain of linked events, stored data becomes one of the MIS manager's prime concerns.

The chain evolves like this: New on-line applications bring additional users on-board. The storage manager buys more storage devices to service these users. With the devices in place, the system slows to a crawl because too many users access too much data too frequently. Each user that creates a demand degrades the productivity of the users, who by now depend on the system.

At this point, the manager must find methods to manage data storage in order to alleviate access-time problems.

Solutions to the problems of data storage will not arise overnight. Although technologies such as optical disk or compact disk read-only memory (CD-ROM) catch the imagination of the public and press, they do not, because of their newness, offer an immediate answer to data storage problems. Managers who cope with I/O bottlenecks daily

must look at currently available technologies such as cache buffers or solid-state devices and techniques such as shadowing to fulfill their data access needs.

According to Anthony Buccheri, director of computer performance and support for Automatic Data Processing, Inc.'s Brokerage Services Group in New York, data access time is important for one main reason. "If you can't get data quickly, you are going to be wasting the CPU," he says. "That is your most expensive resource, so you don't want to keep the CPU waiting."

The I/O bottlenecks that cause delays do not merely waste money; they can bring the system — and the company — to its knees.

In a perfect world, an integrated software package would free the storage manager from worrying about where and how his data was being stored or how quickly that data was being retrieved by users. The manager would simply tell the software what data he needed, what frequency of backup he wanted and what type of performance his data required. The software would take over from there.

But in the real world, the manager is pretty much on his own. He must find a way to manage

Using storage devices effectively requires a delicate balancing act. Maintaining balance depends on knowing what data needs fast access and what data does not.

Raimondi is a Computerworld senior writer.

Storage management can cure I/O snags

Continued from previous page

internal and external storage in such a way that end users receive data without undue delay and without being aware of the system's machinations.

Managing real storage toward that end is fairly easy. In the event of a memory shortage, the user buys a larger computer and plugs them in to his system. If his machine reaches its memory limit, he can buy a new CPU or upgrade to a higher model with increased capacity. Cost is usually the only constraint.

Dealing with the interaction between real storage and external DASD causes most of the storage manager's I/O headaches. In order to provide users with data from both real and virtual storage, a system must segment data into pages and swap these pages between the two sources.

Conventional electromechanical disk subsystems — even the high-end products such as IBM's 3380 tape-compatible drives — cannot always provide fast enough access for paging and swapping transactions. Whenever the transactions fall behind, an I/O bottleneck occurs.

Attempts to access libraries, catalogs, data base indexes and similar collections of information also overpower conventional electromechanical subsystems and cause bottlenecks. Transactions that call for data from these sources account for another large share of the storage manager's woes.

A storage manager can eliminate I/O bottlenecks with one of two technological approaches:

The first approach relies on solid-state storage subsystems and cache buffers to handle very high-performance applications. These devices are extremely capable, but they are also very expensive.

The second approach uses alternative to the high expense of the first. It relies on scaled-down storage devices and human ingenuity to handle very high-performance applications.

Either approach begins with an evaluation of needs. Using storage devices effectively requires a clear understanding of what data is being used, according to Barbara Bowie, a senior consultant with Amdahl Corp.'s consulting services. Maintaining balance depends on knowing what data needs fast access and what data does not.

Some companies use blanket performance requirements for DASD, but Bowie advises managers to determine what data needs fast access, not a good idea. On-line applications require faster access than batch applications do — usually less than 30 msec for on-line vs. about 50 msec for batch. Performance data sets need even faster treatment — typically from 3 msec to 30 msec. The best situation is for managers to follow service-level objectives, she says, so they can meet the service requirements of their systems.

The first approach to data storage relies on cache buffers to improve system performance for heavily utilized data sets such as those on IBM's Data Facility Hierarchical Storage Manager; it calls for solid-state storage devices to page and swap data and to access frequently used libraries.

Cache buffers. These devices are small subsystems that act as a holding tank for data that the processor may need for its next transaction. Holding data in cache eliminates the slowdown caused by the system searching for the data in memory or storage. The buffers generally attach directly to the disk controller but can also reside in a CPU.

According to market research firm International Data Corp. (IDC), only between 10% and 15% of all large DP shops currently use cache buffers. The devices

are gaining rapidly in popularity, though, because of the fast rate of DASD growth.

As data sets grow from single-density IBM 3380 drives to bigger but slower double-density models, cache use will increase, according to Dave Liddell, IBM's manager of storage systems marketing.

"I think that all of our large systems customers will use cache because it gives better performance to their system," Liddell says. About 70% to 80% of a large shop's data can go on 3380 Model E double-density drives without cache, he says, but data sets with very high access rates against them should be cached.

IDC analysts expect 25% to 30% of IBM's large users to support disk cache by 1987. The firm also predicts that 50% of the large shop support caching, IBM will make it a standard feature on 3380 products.

Solid-state devices. These machines use high-speed semiconductor memory to guarantee fast access to virtual memory. Solid-state devices store data in semiconductor memory, eliminating the mechanical delays associated with conventional disk drives.

Systems like National Advanced Systems Corp.'s (NAS) 7900, Storage Technology Corp.'s (STC) 4306 and Memorex Corp.'s 6580 provide data transfer rates at speeds of about 3 MB byte/sec. per port, with no users claiming even faster rates. A quad-density subsystem can move 12 MB bytes per second at a transfer rate.

With these rates, solid-state devices can provide data access at least eight times faster than the fastest electromechanical subsystems, giving access times of .3 msec to 1.6 msec, as opposed to an average of about 14 msec to 17 msec on an IBM 3380 drive.

Solid-state devices are about three times more expensive than their electromechanical counterparts and provide much less capacity. NAS' 7900, for instance, costs about \$468,000. That figure translates to roughly three times the price of a double-density IBM 3380, yet the 7900 stores only 512 MB bytes of data, while the 3380's 5,040 bytes.

User organizations that can afford solid-state devices employ them primarily for paging, swapping and accessing high-activity application data. The devices do not suit all. If the system crashes or its power goes off, all is lost. Vendors offer optional battery back-ups as a remedy.

IBM's 3380 tape drives do not need solid-state devices because Big Blue included in that system an internal solid-state device called Expanded Storage, which meets paging and swapping needs. IBM does not offer any other solid-state devices at this time, but analysts predict the firm will do so sometime in the near future.

The solid-state/buffer cache approach to data storage is in its infancy at the U.S. Postal Service Data Center in San Mateo, Calif. According to John Ku, the data manager for the mainframe of their systems, the center turned to this approach after frequent activity on some data sets — on-line and TSO applications and link libraries — caused bottlenecks to occur.

In support of two Amdahl 5870 mainframes running under MVS (soon to be under MVS/XA), the center operates 464 electromechanical storage devices — a combination of IBM 3386 and 3380-type disk drives — which it supplements with three strings of STC 4306 solid-state devices. The center has ordered two 8-Mbyte cache buffers but has not yet installed them.

The solid-state data manager plans to add, accordingly, to the center's Keathley, the center's program manager for software administration. When the cache buffers are installed, the center will use them for its frequently used data sets. Keathley and Ku considered putting the

Continued on page 36

Tools assist managers with DASD control

No software solution can do a storage manager's job for him, but several tools can help the manager figure out and control his DASD requirements.

Commercial software tools and packages automatically back up and load data, compact it, get rid of information over a certain age and convert data from one device type to another.

IBM, the leading storage vendor for large-scale systems, offers Data Facility (DF) products, a line that includes DF Processor, Hierarchical Storage Manager, DF Product and DF Data Set Services.

DF Hierarchical Storage Manager is an MVS tool that allows for the backup of individual data sets as they change. If a problem arises with an I/O device, the software figures out which data set needs recovery and recovers only that.

DF Product provides storage devices with support in error recovery, data management and access methods.

DF Data Set Services is primarily a dump resource, but it can also allow dumping from one type of disk to another, reformating data as necessary. This tool is said to be especially helpful to managers who are switching to new devices, say from an IBM 3380 environment to an IBM 3380 Model E.

IBM's MVS operating system also supports a tool called the Resource Management Facility that can determine when a CPU needs more real memory and can tell which of a system's data sets are good candidates for caching.

When operations managers discuss storage management software, they frequently mention two tools from vendors other than IBM: Cambridge Systems Group, Inc.'s Hierarchical Storage Manager 2 (ASM2) and Sterling Software, Inc.'s Disk Management System/OS (DMS/OS). ASM2, which runs on large-scale IBM and compatible equipment, resembles IBM's DF Hierarchical Storage Manager. Janet Sanchez, manager of operating systems for American Express Co.'s Card Division, says that until recently, ASM2 offered more functionality than the IBM product. But IBM made some enhancements to its tool, and the two are now about equal, according to Sanchez.

DMS/OS runs on all IBM and compatible computers operating under OS. The software performs reporting on the locations and use of data, provides automatic backup and archival tools, features idle space releases for space that is allocated but not used and organizes partition data sets.

Optional facilities include direct-disk-to-disk migration, interfaces to popular security packages and DASD bitting for rechargeable users.

— Wayne Bernhard

A COMPARISON OF COMMON MASS-STORAGE DEVICES

Storage System	Maximum Capacity	Speed of Data Access	Suitable Applications
Electromechanical disk drive	5G bytes	.4 to 1.7 msec	Most on-line and batch applications
Cache buffer	128M bytes	Maximum access speed	Paging and swapping
Solid-state device	768M bytes	.3 to 1.8 msec	Paging and swapping; high-performance data sets

Electromechanical disk drives serve the bulk of large shop's storage needs, but they cannot provide fast enough data access for specialty applications. A manager can supplement his disk drives with cache buffers and solid-state devices to prevent bottlenecks, but he will pay handsomely for the privilege.

types of data storage because its power goes off, all is lost. Vendors offer optional battery back-ups as a remedy.

IBM's 3380 tape drives do not need solid-state devices because Big Blue included in that system an internal solid-state device called Expanded Storage, which meets paging and swapping needs. IBM does not offer any other solid-state devices at this time, but analysts predict the firm will do so sometime in the near future.

The solid-state/buffer cache approach to data storage is in its infancy at the U.S. Postal Service Data Center in San Mateo, Calif. According to John Ku, the data manager for the mainframe of their systems, the center turned to this approach after frequent activity on some data sets — on-line and TSO applications and link libraries — caused bottlenecks to occur.

In support of two Amdahl 5870 mainframes running under MVS (soon to be under MVS/XA), the center operates 464 electromechanical storage devices — a combination of IBM 3386 and 3380-type disk drives — which it supplements with three strings of STC 4306 solid-state devices. The center has ordered two 8-Mbyte cache buffers but has not yet installed them.

The solid-state data manager plans to add, accordingly, to the center's Keathley, the center's program manager for software administration. When the cache buffers are installed, the center will use them for its frequently used data sets. Keathley and Ku considered putting the

Continued on page 36



**UNTIL TODAY, YOU
NEEDED A COMPUTER
COMPANY, A GRAPHICS
COMPANY AND A
WORKSTATION
COMPANY.
NOW ALL YOU NEED
IS APOLLO.**

On the next three pages, Apollo will present its newest products.

They'll be just a hint of what's to come in 1986. Yet by themselves they'll deliver capabilities and price performance levels that will make our customers shout and our competitors shudder.

In the tradition of every Apollo product that's come before, our newest offerings will let technical people work together as teams. More united than ever. Supported by unprecedented power. Able to work in multi-vendor environments.

More importantly, our newest products will establish Apollo as much more than a workstation manufacturer. We'll be a graphics company. A computer company. A total solutions company. With a broader product line and better technology than anyone else in scientific and technical computing.

For more information, call (617) 256-6600 x4889. Or write Apollo, 330 Billerica Rd., Chelmsford, MA 01824, MS 30.

apollo

Executive Report Managing Data Storage

Continued from page 34
 data sets on the solid-state devices but decided against it because if a solid-state device were to lose power, everything on its drums would be lost.

The price per megabyte of storage rises considerably when a manager decides to use caching devices in addition to electromechanical disk subsystems. It goes up considerably again when he decides to put some of his organization's data in solid-state devices.

For example, according to IDC's David Vellino, the average price per megabyte for IBM's 3380 single-density electromechanical disk subsystem is \$35. The cost of the 3380 double-density subsystem is \$24 per megabyte. An average cost for a controller cache buffer, on the other hand, is \$6,000 per megabyte, while the average cost for IBM's extended storage is \$7,421 per megabyte.

To avoid these cost increases, managers rely on a variety of approaches to data management, which includes a variety of tactics.

Some managers eliminate bottlenecks and speed up access times by

removing subsets of their data from a high-volume, low-performance disk storage device and migrating those subsets to a low-volume disk storage device that provides higher performance. Andahl's Bowie suggests this approach.

If performance is still not acceptable, the manager can add a cache buffer to the setup, Bowie says. If the organization needs more rapid access, the manager might then move critical data sets to a solid-state device.

Other managers use their own methods to eliminate bottlenecks without investing in solid-state devices and cache buffers. Automatic Data Processing's Bucceri is one of those managers. He says the firm's Brokerage Services Group needs faster access to high-performance data sets than its electromechanical storage devices can provide.

The group relies on 483 mechanical disk drives, 10 IBM 3380 and 3390-type drives — all store data on two CPUs. Brokerage Services runs an IBM 3084, an Andahl 5860, two Andahl 470V/84, more than 20 Digital Equipment Corp. PDP-11s and a few DEC VAX machines as well as microcomputers

from Convergent Technologies, Inc. and IBM.

The ever-increasing speed of the company's CPUs, coupled with the static speed of its I/O subsystems, sometimes leads to I/O bottlenecks. When this happens, Bucceri relieves the load on his shop's storage devices by spreading problematic files over multiple devices. "We just take the same file and shadow it onto two different disks," he says.

This shadowing method costs about \$10,000, Bucceri says, as opposed to the \$11,000 per month it would cost to buy and service a solid-state device. Automatic Data Processing would have to realize a sixfold increase in its client base before it could justify such a purchase.

Vendors outside the IBM fold also offer write-once alternative approaches to avoiding bottlenecks. Whereas IBM backs a trend toward bigger and denser disk systems for external storage, these vendors back an opposite trend.

Tandem Computers, Inc., which makes disk systems for its own online transaction processing comput-

ers only, has decided that less is really more. Tandem makes a disk storage facility, the XLS, that employs up to eight high-density disks — each with its own access arm — for a total capacity of 4.2M bytes.

With the Tandem XLS, a manager can request that a file be written over all eight disks and accessed by the eight arms concurrently. Because the disks are fairly small — 8 inches instead of the 10 or 14 — the arms provide quick access, an average time of 15 msec. Control Data Corp. and the Japanese firms Hitachi Ltd. and NEC Corp. also ship 9-in. disks.

Users in the supercomputer and scientific workstation markets have been quick to realize the benefits of these smaller disks. Large system shops may find similar value, according to Rooshabha Varaiya, Tandem's director of engineering. Storage units can rack-mount two 9-in. disks side by side in place of one 14-in. drive.

Small disks spin faster than large ones, are more reliable, consume less energy and generate fewer environmental costs, according to Fred Moore, director of STC's worldwide product marketing. "A lot of the

Continued on page 38

Optical storage emerges as serious option for specialty jobs

By EDWARD S. ROTHCHILD

Before they embrace optical storage, many organizations will hold out for the somewhat distant coming of erasable technology. But trailblazers can move ahead right now with write-once optical storage, a technology that surpasses magnetic storage in capacity and cost-effectiveness for many applications.

Eventually, most MIS managers will consider bringing some type of optical storage into their shops because the technology holds great appeal.

Optical storage devices and media approach the random-access capability of magnetic disks and surpass the tremendous storage capacity of magnetic tape. They can hold and take up a lot less space in the shop. Moreover, all optical media are completely removable, eliminating the need for backup.

Right now, optical storage technology is challenging magnetic storage technology in the microcomputer arena and beginning to attract minicomputer users. Before the keepers of mainframe data storage get involved, however, optical storage technology needs to advance in two ways.

First and foremost, optical storage vendors must offer faster random-access rates. Currently, optical drives beat magnetic tape drives but cannot keep up with magnetic disk drives. Within two years, access speed will increase, and mainframe

shops will begin to take notice. Second, erasable technology, which remains out of reach, must come into its own.

Waiting for erasable disk drives is a safe move for users because such devices closely resemble their magnetic counterparts. Erasable optical drives support reversible media on which users can erase and rewrite data, just as they do on

a total of 5G bytes on 18 magnetic disks.

Users who explore write-once optical technology travel in relatively uncharted territory. Although Japanese users have installed about 6,000 write-once optical disk drives, fewer than 100 such devices have made their way to end-user sites in the U.S.

The advantages of optical storage



Storage consultant Rothchild

familiar magnetic disks and tape. But commercially viable products will not make their mark until 1986 or later.

Write-once optical drives and media allow users to erase and rewrite data; once a user stores data on an optical disk, he cannot change or update the disk's contents.

But write-once products are available right now, and their huge storage capacity makes them attractive to current users of erasable magnetic media — especially users who never use tape over their mainframe or minicomputer.

One 15-in. write-once disk can hold 5.6G bytes of data, the equivalent capacity of about 20 reels of 6.25K bit/in., 4-track magnetic tape. In comparison, IBM's largest disk storage device, the 3380 E, holds a

balance out the risks of experimentation, however, in applications that call for more capacity than magnetic media can provide. Any application that calls for scanned image data is a good candidate.

Write-once optical storage offers an additional advantage over erasable magnetic storage for applications in which an organization cannot risk erasing any version of a record for legal or archival reasons or for maintaining an audit trail.

Applications that meet the two criteria for write-once storage media — include the collection of seismic data as well as the storage of engineering drawings, X-rays and office documents.

The greatest number of business applications fall within the category of document storage. Businesses

can use optical devices and media to store insurance claims, bank loan applications, legal contracts, leases, personnel records and similar documents.

Write-once optical storage offers advantages over film as well. An organization can buy an automatic document disk documentation filing system for the same price — between \$30,000 and \$40,000 — as a device that merely prints hard-copy replicas of documents stored on microfilm.

Optical filing systems typically include a write-once optical disk drive, a floppy disk drive, a Winchester disk drive, a microcomputer, a document scanner and a printer and some application software that allows everything to work together.

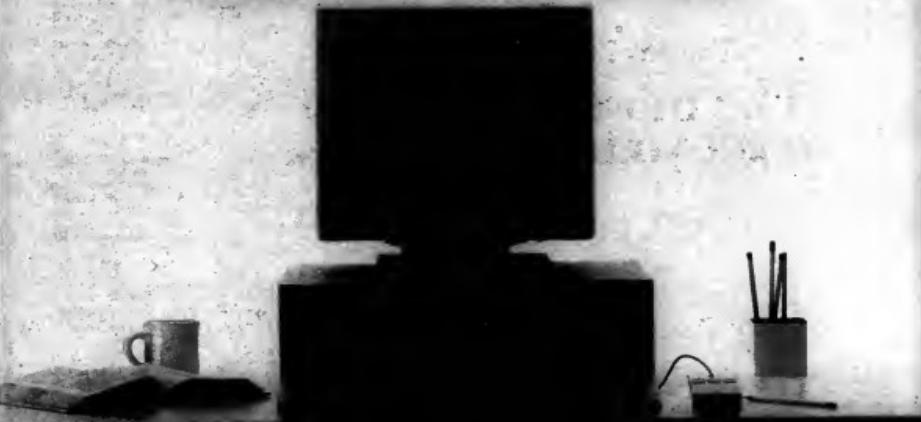
To date, only 1% of all businesses run automated document filing systems. The remaining 80% support no application large enough to justify the great cost of microfilm systems. Now that write-once optical storage is available, however, those percentages seem likely to change.

Although the market for optical storage is very young, it already supports an impressive array of products. Systems integrators offer subsystems that attach to mainframes from IBM, Hitachi Ltd. and Fujitsu Systems of America and to superminis from Digital Equipment Corp. and other vendors.

At U.S. government installations, technicians have interfaced optical disk drives to Cray Research, Inc. supercomputers as well.

At the Comdex/V show in Las Vegas in November, 60 firms showed optical disk products. Many innovative write-once systems were among the lot, including a backup storage system for Winchester disk users that was portable enough to serve a number of permanent computers.

APOLLO FREES THE THOUSANDS OF ENGINEERS BEING HELD POWERLESS BY THEIR PERSONAL COMPUTERS.



The personal power of DOMAIN® Series workstations are priced like PCs, yet they perform up to three times faster.

Consider this: comfortably on a 19-inch monitor with a 32-bit, virtual memory-based Motorola 68020 processor, you can get processing speeds that are

Their powerful graphics are shown on a 19-inch monitor that displays 16 colors in flicker-free motion.

Introducing the Apollo DOMAIN Series of professional workstations that are easy to use like PCs. Yet they're twice the size and

fact that DOMAIN workstations have room inside for a Motorola 68020 processor to deliver processing

speeds only by their graphics. 1024 resolution on a monitor with its four-bit planes, 32-bit resolution, 15-inch

While such qualities alone, DOMAIN workstations were notably designed for technical professionals work as well as their workstations.

Hence, like all Apollo workstations, you transparently share in a high-speed local area network.

An IBM PC/AT™-compatible architecture with integrated options into the system.

And an open architecture with UNIX™ and ETHERNET™ systems made by IBM™ and others.

The DOMAIN Series 30 starts at \$10,000. In color from under a lot of money to attain a position of power.

apollo

Executive Report Managing Data Storage

Continued from page 36

energy in a disk drive is just spinning those platters around and around," he says. "The larger the platter, the more reliability you have because you don't have the wobble and the lack of stiffness that you have out on the outer edges of larger platters."

Mike Stanek, manager of storage product programs at Amdahl, agrees. "The 14-in. platter that we have grown

to know and love," Stanek says, "will be sized down to 9 or 10 inches sometime in the future."

Managers cope with variety of concerns

Of course, the storage manager deals with a myriad of issues other than access speed. He seeks reliability in

storage equipment — the failure of which can cause the whole system to crash. He locates the physical space in which to put storage units. He manages archival resources, and he keeps track of new technology lest his organization miss out on something that could improve services.

Reliability. Unquestionably, reliability is the No. 1 quality that data managers seek in their direct-access

storage devices. The managers need to make sure no hardware or software failures will interrupt system usage.

R. Edwin Earle, vice-president of DP operations for American Express Co.'s Card Division, finds reliability especially important. His division processes 100 million transactions a year and carries 10 million to 12 million cardholders and cannot

Continued on page 42

Survey

Reliability outranks all else

Given a magic wand, what would storage managers create to relieve their problems?

Computerworld senior writer Dennis Rosomond set out to find the answer recently in a series of interviews with storage managers. With few exceptions, the managers said they would conjure up reliable, predictable systems.

Some typical responses follow:

- "Get 100% reliability with a minimal performance/cost impact," said R. Edwin Earle, vice-president of DP operations for American Express Co. "That would be my wish."

99

"I would create a new storage device without losing reliability. It would have very fast access, fit in a very limited space and have low power consumption."

— John Ha,
U.S. Postal Service
Data Center

• "What I'd like is the ability of the mainframe to be smart enough to do some kind of component fault isolation," said Anthony Burchett, director of computer performance and support in Automatic Data Processing, Inc.'s Brokerage Services Division. "It's hard for us to explain to very many users how a single device can cause the system to get hung."

• "No failures," said Bob Cuhinsky, operations manager for Accredited Computer Services. "It means that each time we come in with a new DASD device, we have a burn-in period. It's a simple answer."

• "I would create a new storage device without losing reliability," said John Ha, branch manager of software systems for the U.S. Postal Service Data Center in San Mateo, Calif. "It would have very fast access, fit in a very limited space and have low power consumption."

Fujitsu's 2400-line modem

The most reliable way to get your voice on the line.

The Fujitsu 2400-line modem has exceptional features. Like automatic calling and answering, which saves you time and effort. And two-wire full-duplex operation so it can send and receive at the same time.

The Fujitsu modem uses both synchronous and asynchronous modes so it can give you more information by connecting to your computer. And it's CCITT V.22 bis.

The most reliable modem is also fast. The Fujitsu modem works fast—modulating and receiving at 2400 bits per second for office use. If the modem at one end of the line is only capable of 1200 bits per second, the Fujitsu modem automatically adjusts to the slower speed.

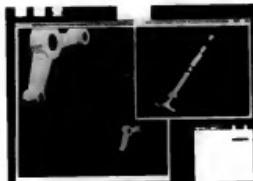
An extended feature card supplies the AT command set and connects to popular modem software.

To get right to the point, call us for the name of the Fujitsu dealer nearest you. 408-946-8777, Ext. 2377.

FUJITSU

FUJITSU AMERICA INC.
DATA PRODUCTS DIVISION
1055 ORCHARD DRIVE
SAN JOSE, CA 95134

OUR 3D GRAPHICS WORKSTATION IS SO FAST IT'S AMAZING THESE PICTURES AREN'T BLURRED.



Until now, if you wanted realtime 3D graphics on a powerful workstation, you had only two choices. Both of them a compromise.

You could purchase a specialized graphics workstation but sacrifice a compatible product family, software and application choice. Or you could opt for a reputable engineering workstation and settle for color graphics that could only be labeled dull.

Introducing Apollo's new DN580. It asks no sacrifice. Instead, this powerful 32-bit graphics workstation overwhelms anything that claims to be either graphic or a workstation.

Its powerful graphics pipeline processor performs 3D graphics at an amazing 100,000-plus vectors per second, a record well

beyond the reach of any other computer or workstation supplier.

Yet despite such speed, the DN580 complies with PHIGS and supports UNIX,[™] dispelling the myth that performance and standards are contradictory terms.

Of course the DN580 offers more than clarity. As part of an advanced distributed processing network, its speed is greatly enhanced by an ability to access other Apollo workstations. As well as systems made by DEC[®] and IBM[®].

And with Apollo's open architecture, you can perform all these stunts with a single system view.

The Apollo DN580. The only thing faster is the rate at which our competitors will have to work to catch up.

apollo

UNIX is a trademark of AT&T Bell Laboratories, Inc., DEC is a registered trademark of Digital Equipment Corporation, IBM is a registered trademark of International Business Machines Corporation.

APOLLO INTRODUCES A PARALLEL PROCESSOR THAT HAS NO PARALLEL.

For those of you whose pursuit of
interminable, Apollo has some very
Introducing the DSP2000™

server that will quell even the

giantly. You'll be able to do up to eight, 16-bit floating-point calculations per second, with performance comparable to a 30 MHz RISC processor.

Some applications require more power than the DSP2000 can provide. In these cases, the server can be expanded to include up to four additional DSP2000 modules.

The result is a system that can handle complex calculations at speeds up to 10 times faster than a 30 MHz RISC processor.

With the addition of the DSP2000, the Apollo server is now a true parallel processor.

It's the kind of processor that has no parallel.

For more information, call 1-800-345-4313.

Apollo Computer, Inc.
100 Morris Avenue, Westborough, MA 01581

800/345-4313 • 508/362-1000 • Telex 252200

APOLLO COMPUTER, INC. • APOLLO, THE APOLLO LOGO, AND THE APOLLO SERVER LOGO ARE TRADEMARKS OF APOLLO COMPUTER, INC.

DSP2000™ IS A TRADEMARK OF APOLLO COMPUTER, INC.

© 1989 Apollo Computer, Inc. All rights reserved.

APOLLO COMPUTER, INC. • APOLLO, THE APOLLO LOGO, AND THE APOLLO SERVER LOGO ARE TRADEMARKS OF APOLLO COMPUTER, INC.

DSP2000™ IS A TRADEMARK OF APOLLO COMPUTER, INC.

© 1989 Apollo Computer, Inc. All rights reserved.

Continued from page 38
Afford downtime. "Any interruption in on-line environment and we are putting literally thousands of people at risk." But, he says, life has two requirements for a storage system. "We want it reliable, and we want early warnings."

Although vendors stress they are closer than ever to providing reliability, not one has devised a fail-safe system.

Automatic Data Processing's Buccheri explains, for example, that in certain kinds of hardware failures, the IBM 3480 tape device cannot properly apprise MVS of its condition. Meanwhile, MVS waits for the device, keeping the whole system in suspense.

What Buccheri wants to see — a wish echoed by many mainframe users — is an ability for the operating system to keep on going and not get hung up by that one device.

Physical space. Physical space in which to keep external storage is a serious problem for many storage managers. The U.S. Postal Service's San Mateo, Calif., data center, for example, had to buy a new facility and move its DP operations a year ago largely because it ran out of places to put DASD, according to the center's branch manager of software systems, Ku. The new facility will be good for five to seven years of normal growth, he says.

Other managers, though, seem already to have assimilated new, compact devices to the point where they seldom see size as an issue.

"So far, the technology has been changing enough to allow us to move old technology out and new technology in at a pretty reasonable rate," says Buccheri.

New products, such as the dual-density lines from IBM and the plug-compatible manufacturers are bringing out, give plenty of capacity in relation to physical size, he says.

Although IBM by far garners the biggest share of the large-scale disk device market, some users are opting to buy more affordable versions because they make better use of space.

Buccheri, for instance, says he started buying Am-dahl disk drives because they make use of upper air space. He also is converting from 3350- to 3380-type devices because he can theoretically double the amount of data stored in the same physical footprint. In reality, however, performance figures show a 1.5:1 ratio.

Archival storage. Data's final resting place, the archival storage subsystem, is the least of the storage manager's troubles. For both

Continued on page 50

IBM drives trends in mainframe storage mart

By DAVID VELLANTE

In the near future, mainframe data storage managers can expect to continue to be influenced by IBM's product introductions, namely the 3380 dual-density disk drives and the 3480 cartridge tape drives. But as

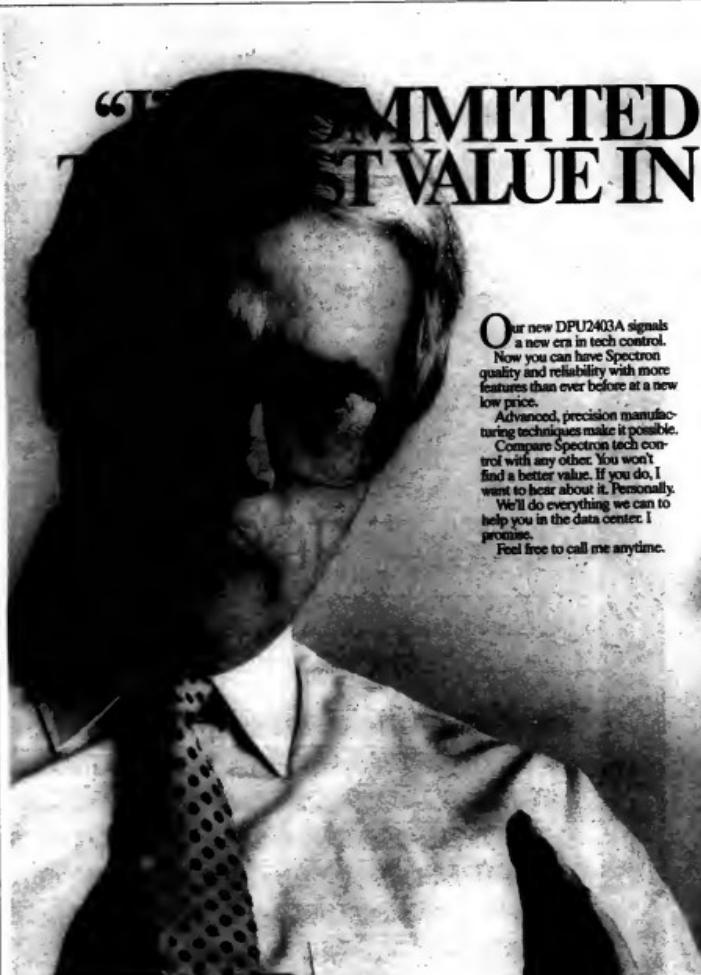
1990 approaches, managers may have the option of using "quad-density" devices or thin-film technology.

IBM's dramatic announcements and enhancements of large-scale storage devices during the past 15 months will continue to have an impact on the data storage arena throughout the 1980s.

Evidence of IBM's confidence in its ability to exert control over the mainframe disk market came in the form of a February 1985 announcement of a double-density 3380 disk drive designed for use in a path to dual-density for the whopping 200,000 spindle installed base of original 3380s that had accumulated since 1981.

Instead, the company introduced a new single-density 3380 that is upgradable to the double-density version. The new drive is designed to reside on the same controller string as the older 3380 devices.

From a revenue standpoint, it is in IBM's best interest to migrate users to the



Our new DPU2403A signals a new era in tape control. Now you can have Spectron quality and reliability with more features than ever before at a new low price.

Advanced, precision manufacturing techniques make it possible.

Compare Spectron tech control with any other. You won't find a better value. If you do, I want to hear about it. Personally.

We'll do everything we can to help you in the data center. I promise.

Feel free to call me anytime.

Executive Report Managing Data Storage

double-density 3380. It is also, however, in the company's interest to make the transition to dual density as smooth as possible.

The reasoning behind IBM's introduction of a single-density upgradeable device, in conjunction with the dual-density 3380, is that the firm recognized the continued short-term market demand for a single-density 3380-class drive.

Typically, with an in-

crease in capacity, users experience a decrease in performance. The dual-density 3380 is no different — the more data under the same number of heads, the greater the impact on drive performance.

When making a purchase of 3380 storage devices, users have three basic options with respect to performance problems. One is to purchase a double-density 3380, utilize its full capacity and in-

stall extremely fast cache memory chips that reside on the 3380 controller.

Another option is to purchase a double-density 3380 and only use one portion of the drive's capacity, maybe one-half, hence achieving similar performance to single-density devices.

A third choice is to purchase a single-density drive. Because each option has strengths as well as drawbacks, many users are faced

with a trial and error situation.

It is estimated that only about 12% of mainframe users currently employ cache memory. Perhaps when 50% of the mainframe user base has cache, IBM will make it a standard feature on the 3380 controller. This will likely occur late in 1988 when IBM is expected to introduce its next-generation

quad-density device.

IBM's recent price cuts in the area of double density as well as drive and cache upgrade prices clearly indicate its desire to move users to double density. The price of the single-density drives stayed the same as an incentive to get users committed to dual density.

Although IBM's strategy presents an opportunity for price-compatible manufacturers to develop products at prices below those offered by IBM, the company is still likely to succeed in eventually moving its user base to dual-density drives.

As 1990 grows closer, the inevitable announcement of a quad-density device raises future considerations. To use such a device effectively, cache memory and storage management software must be firmly in place.

Furthermore, IBM's experience with thin-film technology may become a data storage issue. This technology will be critical to the advancement of the 3380

"

IBM's recent price cuts in the area of double density clearly indicate its desire to move users into that arena.

TO GIVING YOU TECH CONTROL."

Doug Leger
General Manager, Spectron

COMPARE FEATURES. Introducing the new Spectron DPU2403A digital patching unit.

Smaller size	Front-loading modules	On-line monitoring/test access	Hermetically sealed switch contacts	Precision wave-soldered connections	Full interface patching	Three interface signals
--------------	-----------------------	--------------------------------	-------------------------------------	-------------------------------------	-------------------------	-------------------------

NEW

COMPARE PRICE.

Our superb, new DPU2403A is priced 25% below last year's equivalent model. With more features than ever before, it's clearly the best value in digital tech control patching.

Check the chart and see for yourself.

MANUFACTURER	MODEL	Avg. PRICE*
ADC Electronics	Blockline	\$2450
Adams Research	Duo-Patch	\$2400
Dynatech	Mark II	\$242
SPECTRON	DPU2403A	\$1660

Then call your regional Spectron representative or order direct by calling (800) 222-0867, Dept. 608.

*Based on current mark of February 12, 1986. Based on average price of 10 units. Actual price may vary depending on options selected. Prices subject to change from model to model. Prices subject to change.

SPECTRON

nt
northern telecom

To ORDER CALL YOUR
SPECTRON REPRESENTATIVE
OR (800) 222-0867 Dept. 608
IN NEW JERSEY CALL
(609) 595-4700 Dept. 608

Velvento is a program manager in the storage products market program for International Data Corp., a market research firm based in Framingham, Mass.

family beyond double density.

The Japanese-supplied drives available from National Advanced Systems Corp. and Amdahl Corp. have, to date, relied on extremely slick and efficient packaging schemes using multiple spindles and conventional ferrite-head technology. At some point they will be able to make decisions regarding thin-film head implementation.

Other products in the area of mainframe storage that will shape the management of data as we approach 1990 is the 3480 cartridge tape drive and the advent of very fast solid-state storage devices as a means of paging, swapping and bringing high-transmission data.

Ultimately the effective use of combinations of disk, tape and solid-state storage depends on the user's application. Managers must give careful consideration to the cost and performance issues associated with emerging storage technologies before they buy.

Small drives, intelligent controllers set mini storage trends

As 1990 approaches, managers can expect a number of price/performance advances in minicomputer-based data storage devices. Among the trends managers will see is a shift to smaller form-factor drives, higher capacity 5½-in. Winchester disk drives, and multi-spindle disk subsystems and intelligent disk access controllers.

The acceptance of the minicomputer as a departmental system spurred the use of multiple-spindle 10½-in., 9-in. and 8-in. drives, which provided users with alternatives to 14-in. Winchester drives.

Prior to 1984, 8- and 9-in. rigid disk drives were not commonly used

in the mid-range to high-end minicomputer market. That changed during the past two years, however, when system vendors and OEMs alike found that design and better performance/cost ratios resulted from the use of smaller drives. These smaller drives will continue to gain in popularity for several reasons:

- The form-factor allows two smaller drives to be rack mounted side by side, which can double the overall capacity of the rack.

- Smaller drives are more flexible in terms of capacity and removability. Depending on the application, users can rack mount different capacity drives in 8-, 9-, 10½- and 14-

in. models.

- Smaller drives support the storage module drive (SMD) interface, which is becoming a standard with minicomputer disk OEMs. The drives also support intelligent interfaces, which will begin to be employed extensively into 1990. With these interfaces, system vendors can relegate storage housekeeping tasks to the disk controller.

- These drives offer some of the most impressive performance/specifications in the industry.

- They are also more flexible when it comes to configuring storage devices for minicomputers. For example, Control Data Corp. plans to in-

duce 9-in. 300M-byte solid-state drives, which will be significantly less than its current 40M-byte drives, which will be directly plug-compatible with CDC's older 9766 removable drive. The 9-in. drive will be smaller and more reliable, consume less power and cost significantly less than the 9766.

Other 9-in. disk vendors have been successful marketing their products as a direct supplement to the 10½-in. Fujitsu Ltd. Eagle. In situations where there is no room for a second 10½-in. drive or if 8-in. drives do not meet vendor or user requirements, the 9-in. drive is a viable alternative. Tandem Computers, Inc. for example, recently introduced a 4.2G-byte subsystem based on 9-in. technology.

Fujitsu's 4.74M-byte Eagle I, introduced in 1982, has become one of the most popular devices in the industry. Keeping pace with the demand for higher capacities, Fujitsu unveiled the second-generation Eagle II in 1984. The drive offers a 6.68M-byte capacity at a high-speed SMD transfer rate of 2.4M bytes/sec. Because the older Eagle is feeling pressure from 9-in. drives from its competition, Fujitsu must place more emphasis on the newer Eagle II model in 1986.

Fujitsu's direct response to the popularity of smaller form-factor drives is a small computer systems interface (SCSI) node that links four 3½-in. 8-Mbyte drives to be connected. This configuration will become popular as other vendors plan similar deployments involving SCSI. The SCSI interface also has implications for the 5½-in. Winchester disk drive. The capacities of this device will go beyond 300M bytes by 1990.

Because of increases in power and the ability to cluster processors, the high-performance minicomputer market has grown rapidly, creating a need for more complex disk subsystems.

Another trend that will appear as 1990 approaches will be the emergence of intelligent controllers that can manage intricate disk and tape combinations efficiently.

Intelligent controllers will allow multiple disk and tape devices to be attached and concurrently accessed by a number of clustered CPUs. Currently, state-of-the-art controllers allow 20 to 25 disk drives to be managed by as many as 15 processors. As the number of controllers in the configuration increases, the need for intelligence becomes more evident. Intelligent devices have features such as the following:

- Dual porting — allows transfers of data to be done simultaneously with handling seek requests.

- Backup utilities — such as disk-to-disk or disk-to-tape are managed by the intelligent controller.

- Positional tracking — the controller keeps track of spindle rotational positions allowing seek requests to be fragmented and handled based upon the position of the read/write head.

- Cache buffers — as with mainframe controller cache, the more reads that can be handled through cache memory, the less mechanical movement is required.

All of these features are controlled by a microprocessor, and all are transparent to the host system.

— David Vellante

"Not during a full moon I won't."

—Computer backup excuse #243

People can get very superstitious about when they do their computer backup. Especially if it gives them an excuse for not doing it at all.

Because, after all, backing up is about as exciting as watching paint dry.

One way to take the curse off is to do it first thing in the morning. If you're one of those slow starters who has to have coffee and push some papers around for awhile when you get to work, that dead time could be perfect for backup.

As for how to do it, the floppy disk is fine if you have a limited amount of memory, and the data cartridge for 5 to 10 Mbytes or over.

To learn more about backup and other applications of the data cartridge, a 3M developed technology

whose time has come, contact your local computer products dealer.

And maybe you won't be one of those people who does his backup only once in a blue moon.

When you run out of excuses.



Why the three letters you think of first for System/38 add-in memory shouldn't be IBM.



EMC introduces its IBM memory expansion card for the System/38. EMC has just added a feature to add-in memory for IBM's System/38 that's been sorely lacking.

Competition.

Like IBM's 1 Megabyte add-in memory, our new memory expansion card lets you boost the speed and performance of your System/38. Without increasing software or other hardware costs.

But unlike IBM, we let you do it for \$2,000 less. [IBM's price is \$7,500, ours is just \$5,500.]

And our new 1 Megabyte memory uses newer, more reliable technology. It's so reliable, there are no maintenance charges of any kind.

IBM, on the other hand, charges you a memory maintenance fee of more than \$1,000 a year. Every year.

Our memory comes with the industry's only unconditional warranty.

EMC is the first company to ever offer you an unconditional lifetime warranty on a System/38 memory card. And we offer the same warranty on every other memory card we make.



And we'll install a special toll-free hotline and we'll send you a new card within 24 hours—absolutely free.

And our new memory expansion card is 100% plug compatible with the System/38. So it supports all IBM memory and memory diagnostic features. Installation takes just 10 to 15 minutes (you can even do it yourself) and does not affect your IBM maintenance coverage in any way.

We're the name DEC, HP, Prime™ and Wang™ users remember first.

EMC is the only independent supplier of memory expansion cards for the System/38.

As well as the world's largest manufacturer of add-in memory for minicomputers, including Wang, DEC, HP and Prime.

Among our customers are AT&T, Merrill Lynch, Ford, Bank of America, General Mills, EXXON, 3M and many other Fortune 500 companies.

But you can't appreciate all that an EMC memory board can do for your System/38 by reading an ad.

You've got to use it.

To let you do that before you buy, we've come up with a special trial offer for qualified System/38 owners. Just call or write EMC Corporation at 12 Mercer Road, Natick, MA 01760—and we'll install a "no maintenance"

memory board for you without cost or obligation.

Then you can evaluate it for two full weeks on your own system, running your own applications.

Once you do, remembering our name will be a snap.

For your free two-week evaluation, call today:

1-800-222-EMC2

[In Massachusetts, call 617-655-6600]

EMC²

No one is more committed to memory.

EMC is a registered trademark of Digital Equipment Corporation.
Prime is a registered trademark of Prime Computer, Inc.
Wang is a registered trademark of Wang Laboratories, Inc.

I'm interested in obtaining an EMC evaluation board, free. Please send more information.

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____
EMC Corporation, 12 Mercer Road, Natick, MA 01760
617-655-6600/1-800-222-EMC2 (in Massachusetts, call 617-655-6600)



This much data.

Tape coated with Du Pont Chromium Dioxide

This compact cartridge* is a major innovation in computer tape technology. It holds 20% more data than a standard 10½" reel.** Yet it takes only one-fourth the storage space.

A key reason for this increase in storage capacity is the chromium dioxide magnetic crystal.

Thanks to Du Pont chromium dioxide, the 18-track tape has a recording density of about 38,000 bytes per inch—six times higher than the current industry standard. This higher density makes it possible to pack more than a reel of data into the compact 4" x 5" cartridge you see above.

The higher density also contributes to

*ANSI proposal X3B5-182.
**ANSI X3.45-1982.

In this much space. On chromium dioxide tape.

stores 20% more data in 75% less space.

an improved data transfer rate of 3 MBytes per second. So now you can process information more than twice as fast as before.

Du Pont not only invented chromium dioxide but is committed to developing its use in new magnetic recording applications, including high density data tape. So when buying data cartridges, make sure you ask for

tape made with Du Pont chromium dioxide.

For more information, write Du Pont Company, Room X50261, Wilmington, DE 19898, or call 302-992-2246.



Du Pont Chromium Dioxide

Optical disk drives, improved capacity lead micro trends

By EGR. JULIJSSSEN

Two far-reaching trends will determine the course of personal computer mass storage over the next decade. First, optical disk drives will emerge as the storage devices of choice. Second, other devices will increase their capacities and performance in an effort to compete.

Optical disks take hold. Personal computer users require both on-line data storage and off-line data storage. They also need a medium for storing and loading programs. Right now, no mass storage technology can satisfy all three needs.

Optical disk drives hold the potential to meet each requirement. They have the ability to provide the three functions at a price that the business user can afford. If they fulfill their promise — a safe bet — optical disk drives will begin outselling magnetic storage devices by the mid-1990s.

Before optical technology can enter the mainstream, though, manufacturers need to offer erasable capabilities and to bring the price of erasable optical disk drives down to more than that of Winchester disk drives.

Currently, optical drives support just read-only and write-once capabilities. Both impose limits on users.

Read-only optical disks come with pre-recorded information that users cannot change. Write-once disks start out blank, but once a user records information, he cannot modify or erase it.

Manufacturers will start marketing erasable optical disk drives in about two years. Initially, they will cost a lot, but by the early 1990s, their prices will be no higher than those of Winchester disk drives.

Capacity and performance increases across the board. Manufacturers of the current leading storage devices — floppy disk drives, Winchester disk drives and tape drives — will have to increase storage ca-

pacity and performance if they hope to compete.

The need to increase capacity is nothing new. Vendors generally increase the amount of storage that users can obtain for a given price by between 400% and 500% every five years. But less predictable changes will also occur as manufacturers of magnetic storage devices strive to keep their products step with optimizes' performance.

Each type of device will rise to the challenge in a different way:

- Floppy disk drives. Of all the currently popular storage devices, the floppy disk drive is the most versatile. It supports a low-cost, removable storage medium and is easy to use. Most important, it can perform all the storage functions that users need: on-line, off-line and software storage. Floppy disk drives are not straining to keep up with capacity and performance requirements, particularly for on-line storage.

In the next five years, the floppy disk drive market will transform itself. Today's low-capacity floppy disks, which store 100K to 400K bytes of data, will give way to high-density disks that store 1 M byte or more.

- Winchester disk drives. The floppy disk's limited storage capacity is forcing users to turn to Winchester disks, which can fill most personal computer users' on-line data requirements. Right now, about one quarter of all personal computer business users rely on Winchester disks. By 1990, more than half will use them.

But Winchester disk drives have their drawbacks as well. Because the Winchester disk is a fixed medium, users cannot remove data from their personal computers and cannot get to that data unless the computer is operating. A Winchester disk cannot provide off-line storage or serve as a medium for storing and loading software programs.

- Removable Winchester disk drives offered a glimmer of hope for off-line storage, but these devices turned out to be a disappointment. Removable Winchester disk technology has been slow to develop, unless a major vendor endorses it, and the chances of this happening are slim.

- Tape drives. Users can supplement a fixed Winchester disk drive with a tape drive that serves as a backup, off-line storage system. Their willingness to do so has created a market opportunity for tape technology.

Until a few years ago, tape drives were nothing more than a niche product in the personal computer industry. But by 1990, 14-in. cartridge tape drives will become standard equipment on most micros; already, they rank as important add-ons.

Before personal computer makers will package tape drives with their machines, however, tape drive manufacturers will need to offer products that fit into the same space as a 3½-in. disk drive.

DASDMON...

A new age in DASD tuning From the DASD performance leaders

Duquesne Systems, a DASD performance leader for 15 years, announces a new age in DASD tuning with DASDMON. Unlike traditional data sources, which supply only fragments of data, DASDMON provides a comprehensive and easy way to pinpoint critical DASD I/O contention problems in MVS and MVS/XA environments.

Features include:

- ISPF displays
- SAS® programs for reports
- Seek analysis for dataset repositioning
- Control cards for DASD reorganization

With DASDMON's unique I/O reporting and analysis system, you quickly identify DASD performance problems. Let it help you today prevent overall system degradation due to poor DASD dataset organization.

ISPF is a registered trademark of IBM Institute, Corp., N.Y., U.S.A.



**DUQUESNE
SYSTEMS**

Two Allegheny Center
Pittsburgh, PA 15212
(800) 323-2600
(412) 323-2600 Inside PA

Juliussen is president and chairman of Future Computing, Inc., a Dallas-based market research firm that publishes reports on the personal computer industry.



Executive Report Managing Data Storage

Continued from page 42
backup and archiving, managers say, tape technology is reliable and progressing.

But the physical space problems for archival tapes are actually decreasing with the use of magnetic tape cartridges, first shipped by IBM in early 1985. IBM 3480 cartridges are about one-fourth the physical size of their 10½-in. reel-to-reel fore-runners and hold approximately the same amount of data.

In addition, according to American Express' Earle, the labor costs associated with cartridge cartridges are those associated with tapes because cartridges do not require as much attending to as the reel varieties.

New technology. A number of technologies such as bubble memory

and charge-coupled devices have challenged magnetic disk tape devices during the past 25 to 30 years, but today's magnetics maintained advantages in technology and price, the new types never became popular. Similarly, there does not appear to be any technology on the horizon that will do anything but complement existing disk and tape products.

Many analysts and end users see optical disk storage as the next new-wave storage technology, but optical storage suffers from a lack of standards and from the inability to write

over data (see story page 36). Although the technology fits some applications perfectly — storing permanent records for a health care organization, bank or insurance company, for instance — the traditional large system DP shop is adopting a wait-and-see attitude.

Experience has told us, if you go into a new area, the first product is not always the best because there are problems or the vendor comes out with a better idea six months later," explains Bob Oshinsky, operations manager for Accredited Computer

Services of Cleveland. Oshinsky's firm serves financial and savings and loans institutions.

User organizations want performance, reliability and cost-effectiveness before technological advancements, according to Luke Little, Memorex's vice-president of development engineering and technology. "Performance is a growing issue, and of course cost-per-unit — how many dollars per megabyte — is always an issue," he says. "We do not get a lot of requests for exotic, specialized features."

Nothing radically new will evolve in the traditional disk market for the next five years, Little says, and many vendors echo that opinion. Enhancements and improvements will continue to add capacity and performance.

99 Nothing radically new will evolve in the traditional disk market for the next five years.

It's not surprising that the company which invented Dataswheel printing should be the one to take it to a breakthrough level of performance.

Introducing the Xerox 635. Dataswheel Printer, the next generation of Dataswheel.

It's fast — up to 55 cps. It's quiet — perfect for a busy office.

And because it's a Xerox printer, the 635 just won't quit.

It's also extremely easy to use. With automatic sheet loading, a simple control panel, and snap-in

interface cartridges give instant compatibility to most microcomputers, including Xerox, IBM and Apple.

The Xerox 635 has a choice of 225 drop-in printheads including Xerox, Apple, LaserJet and IBM typesfaces and fonts. So you can make almost all your documents look uniform.

And only Xerox offers you such a complete line of peripherals. Like a bi-directional tractor, single-bin sheet feeder, dual-bin sheet feeder or dual-bin sheet feeder with an envelope bin.

Call 1-800-TEAM-XRX, ext. 122, or send the coupon below.

Because you gain a lot by setting higher standards.

Xerox Corporation, P.O. Box 24, Rockwood, NY 14540.
For additional or further information about the Xerox 635:
1. Call 1-800-TEAM-XRX, ext. 122.
2. Please send a dealer or sales representative
3. Please send me more information.

NAME	TITLE
COMPANY	
ADDRESS	CITY
PHONE	ZIP
If you can't read, call 1-800-TEAM-XRX, ext. 122 (214) 452-0775, ext. 122	
013/3/86	

The people who set the industry standard just raised it.

Books, events offer more information on data storage

Readers who are interested in learning more about current trends in storage technology and management should find the following publications and events helpful.

Publications

Developments in Optical Disc Technology and its Implications for Information Storage and Retrieval. R. Barlett, 3000 Mutual Book and Periodical Service Inc., New York, 1981.

Optical Disc Technology (214-641-0452), IBM General Product Division, San Jose, Calif., 1980.

Introduction to IBM Direct Access Storage Devices. Marilyn Gold, Science Research Associates, Chicago, 1983.

Optical and Magnetic Data Storage Materials: Materials Research Society Symposium Proceedings. G. Sato et al., editors. Marcel Dekker Publishing Co., New York, 1984.

Optical Memory Systems. Holloman Consultants, San Francisco, 1985.

Storage Standard Handbook. Digital Press/Digital Equipment Corp., Burlington, Mass. 1984.

Events

MARCH 11-13, WASHINGTON, D.C. — Fourth Annual Household Storage Opportunities Conference. Sponsored by the Institute of Household Manufacturers and Traders. Contact: Judith Rossen, 500 North Birchfield Corporate Park, P.O. Box 14917, San Francisco, Calif. 94116.

MAY 13-16, DALLAS — Optical Storage '86. Contact: Cartidge Association, Suite 1100B, 1100 Winchester Blvd., San Jose, Calif. 95122.

JUNE 9-11, NEW YORK — Optical Storage '86. Contact: Cartidge Association, Judith Rossen, Birchfield Consultants, P.O. Box 14917, San Francisco, Calif. 94116.

SEPT/NOV 22-24, SAN JOSE, CALIF. — Data Storage '86. Contact: Holloman Consultants, Suite 1100B, 1100 Winchester Blvd., San Jose, Calif. 95122.

In Depth

Multiuser system vs. local-area network: There is a right choice



ILLUSTRATION BY DON DUNNIS

Personal computer-based networking seems more flexible, but minicomputers offer purer data integrity. DP managers should weigh CPU tie-ups and maintenance issues more heavily than acquisition costs.

By JOHN DUNNIS,
SHARON EFROYMSON
and LYLE ANDERSON

Often the most elementary decision in automating a department is choosing which multiuser solution to implement — a personal computer-based local-area network or a true multiuser shared-logic system, such as a mini-computer or multiuser microcomputer. The answer is rarely black and white.

The technologies are complex primarily because of the rapidly changing software products available for local-area networks, personal computers and end-user computing.

Unfortunately, many departments of large corporations have invested in local-area networks as their multiuser solution for the wrong reasons. In many cases, managers of end-user departments implement their systems on a local-area network to get away from MIS, which they feel does not respond to their needs; in other cases, users who have no MIS experience feel that anything that can be implemented on a minicomputer can be implemented with personal computers and a network.

To often, managers do not perform a needs analysis, nor do they consider long-range goals. They then purchase networks on the basis of a single item, such as cost, and those networks fall because users do not consider network performance, growth, applications or how the system fits into the overall systems architecture.

In most cases, a careful evaluation will reveal that either alternative will meet some of the company's requirements. Weighing the trade-offs forces managers to determine what scale of system is needed, based on a complex

matrix of current and anticipated needs.

Minicomputers are traditional computer implementations, while network-based and multiuser microcomputers are relatively new. Each offers different strengths and can be a real asset in the right setting. In the wrong setting, each can be a real lemon.

A successful implementation

One of New York's prominent financial organizations implemented a local-area network, which kept costs down and solved many operational problems. The network was implemented in a division with about 100 investment analysts working on projects for different clients.

In the past, the firm had installed approximately 40 personal computers, which analysts used for spreadsheets and communications with outside time-sharing services. The analysts found the personal computers to be useful tools and had already converted most of their financial analysis procedures. Most of the personal computers, however, were located in the information centers, with few found on the individual's desk. Analysts assigned to specific projects generally worked in the same room and passed information back and forth by copying files onto diskettes.

The firm then moved its offices and decided to double the number of personal computers as it redesigned the office. The new personal computers were installed where they were most needed — in the end users' offices. A needs analysis revealed that the firm needed a multiuser system of some kind to make sharing data more efficient.

A local-area network seemed the best choice for the following reasons:

- The end users required minimal concurrent access to data bases or files. Their applications, primarily spreadsheets, were heavily CPU-intensive. Shared-logic systems would not provide equivalent performance in the same price range — they were significantly slower for these applications, which would severely limit productivity.

- Sharing peripherals was a key need. The cost saving from not having to purchase enhanced personal computers and printers in this case more

Dunnis is the director of systems development and consulting for the Center for Advanced Data Processing, Inc. (CADP) in New York.

Efroymson teaches personal computer communications to corporate clients at the Productivity Center of CADP.

Anderson is a principal at DMR Associates, Inc., White Plains, N.Y., specializing in end-user computing and systems planning.

"My idea was
to give our PC users
of System 3X a unique file
transfer option:
freedom of choice."

Our IDEAccomm 5251 works
with PC Support/36
and a host of other
file transfer packages.

No one gives IBM PC users more ways to transfer information to and from the IBM System 34/36/38 than IDEAssociates. For example, our IDEAccomm 5251 provides complete support for IBM's FSU and FTF programs. And we've just added PC Support/36 compatibility.

It's one more way we're keeping pace with IBM, step for step.

And as IBM announces enhancements, our in-house development capabilities will enable us to respond. Just as we were able to ship the first fully functional twinax emulator in 1984.

It shouldn't surprise you, then, to learn that many software companies have decided that our IDEAccomm 5251 is the one they'll support. With file transfer packages like DecisionLink™, SmartLink™ and Intelink™, IDEAccomm gives PC users a broader range of options. Best of all, it does all this and still only requires 30K of memory.

So when you have a great idea for giving your PC users the freedom to choose file transfer options, look to IDEA.

Call us at 800-257-5027 for more information.



IDEAssociates™

The best IDEAs for personal computers.

IDEAssociates, Inc., 35 Doremus Rd., Allentown, PA 18106, Tel: 610-432-4978.
Europe: Switzerland (01 71 79 79), U.K. (01 944 860 000), France (01 43 80 38 00), Germany (089 51 11 39), Italy (02 438 388).

SIMM and the IBM logo are registered trademarks of International Business Machines Corporation. DecadeLink is a trademark of Lattice Laboratories Inc. SmartLink is a trademark of Software International. Intelink is a trademark of Novell Data Systems Corporation. Inc. IDEAccomm 5251 is a trademark of IDEAssociates, Inc.

In Depth/Multiuser Systems vs. Local-Area Networks

than offset the additional cost of the local-area network equipment. While it was a good idea, the hardware and software sharing, the firm's managers felt that the additional administrative and operational costs of the system would be prohibitive.

* Analysts often worked under tight deadlines, so system reliability had to be extremely high. While shared-logic systems inherently offered greater reliability, this advantage did not need to be sacrificed with the local-area network solution. A spare server was acquired so that if one component failed, another personal computer or server could be used.

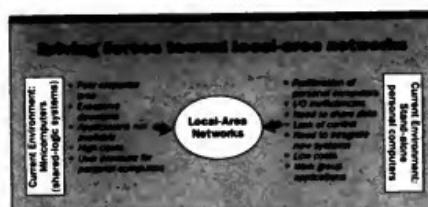
* Office locations were constantly changing, and personnel were always being added, making the flexibility of reconfiguration imperative. A shared-logic system would require that time-consuming utilities be executed whenever a terminal was added, whereas the local-area network solution would allow users to simply "plug in" to the system.

Ending diskette derby

After using the new departmental system for several months, management found that productivity among the analysts had steadily improved. The analysts were creating libraries of standard work sheets and sharing them.

Electronic mail also enabled analysts to communicate and spreadsheet to other users, eliminating the diskette derby routine.

However, even in this firm, the local-area network solution could



Flexibility, off-the-shelf applications and local intelligence drive users to consider personal computer-based local-area networks as their multiuser solution. Nets also can protect users from experiencing excessive downtime.

have been improved upon. The same company had installed minicomputers to provide word processing and office functions to the secretarial staff.

Management found that the minicomputers offered the advantage of a single integrated environment for shared applications, documents and lists but could not effectively handle spreadsheet work at the local workstations as the personal computers could. However, because of the firm's heavy investment in the minicomputers, it had to make use of each.

Here, the benefits of using personal computers and the limitations of minis far outweighed the firm's desire for a single integrated environment. Therefore, it was willing to install a second network connected to the minicomputers for the secre-

taries to use for word processing and administrative applications.

Even though it would have been more efficient to support both types of users on a single network and allow them to transfer information back and forth, the strength of each alternative, for its particular use, forced the company into a dual-computer environment.

The investment firm has implemented the best solution for today, with an eye to the future. As an interface between the two systems becomes available, the firm plans to move to a shared environment. Then, with both personal computers and minicomputers hooked to one network, analysts can create documents and send them to the secretaries for final editing and distribution.

In addition, the heavy spreadsheet use on the personal computers

will not bog down the minicomputers, so both the secretaries and analysts can get good performance.

Benefits of networking

The above examples illustrate a key point about local-area networks and shared-logic systems: offer benefits and force trade-offs; users must determine how to compensate when the chosen solution falls short.

Flexibility is the main asset of a local-area network implementation. Users can purchase off-the-shelf software packages and retain the benefits of the intelligence inherent in personal computers. Networks also facilitate utilization of installed equipment.

Since much processing is precessed at the intelligent workstation and not at the network server, there is greater protection against failure of the entire system. In many cases, if an IBM Personal Computer XT or AT has been defined as the server and it fails, another may be installed in its place (with some swapping of boards), and the information may be restored with minimal downtime.

Local-area networks were considered a fad by many users, but with introductions like IBM's PC Network, most users feel confident that personal computer-based networking is a solution with a future. The introduction of IBM's PC-DOS 3.1 and NetBios provided a standard, encouraging many hardware and software vendors to offer a variety of local-area network environments.

When users evaluate alternatives

 THE CICS TOOLBOX CALL 1-800-825-TONE 1-800-825-0863 IN CALIFORNIA AND CANADA 1-714-891-0400 <i>Anaheim, CA 92604</i>	 MULTI-TRAN Multiply Your CICS Power with • Up to 4 Concurrent CICS Transactions • Windows • Each Session: 16MB Random Access • Built-in Screen Reader and • Shading
 FAST FORMAT • Format CICS Screen Automatically • Screen Automation Programming Tool • Define Text Device • Create Text Device • Create Text Device with Screen Formats Online	 TCC Add TSO to Your CICS Environment with • THE CICS CONNECTION™ • Includes Multi-TRAN Features • Includes CICS Transaction Logon/Logout • Supports TSO-EYP Functionality
 CSMT LOCK • Solid Support for Online Application Development with • Data Entry • Data Entry • Data Entry • Job Substitution • Online Screen Updates • Online Screen Updates • User Authentication Options	 TS-SAFE Get Cost Effective CICS Security Now with • Standard Screen Table Transformation • Control Screen Updates • Standard Screen Input to Programs and • Security Logging/Authentication Data
 TS-DEARS • Solid Support for Online Application Development with • Data Entry • Data Entry • Data Entry • Job Substitution • Online Screen Updates • Online Screen Updates • User Authentication Options	

Converting to 4300?

Make it simple with CPG!

Are you one of the 50,000 users affected by the recent announcement to withdraw support for the System/34?

Upgrading to a 4300 machine can be a difficult and costly exercise.

CPG is a simplified, cost-effective productivity language for converting your existing online programs.

CPG was designed to enable online applications to be developed quickly, efficiently and inexpensively. Its simple, well-proven techniques make for an easy to learn tool and the speedy generation of efficient programs under CICS or SHADOW II.

Plus, its compatibility with RPG allows your existing System/34 programs to be converted in hours rather than weeks.

If it's time for you to move up to a 4300, call THORN EMI Computer Software today for further information or to request a 30 day free trial.

THORN EMI Computer Software

285 Mill Road Chelmsford MA 01824
 Telephone (617) 256-3000 (800) 225-4025 in Canada (800) 525-4025

In Depth/Multiuser Systems vs. Local-Area Networks

for implementing departmental computing, they often fail to see the forest for the trees. Some in smaller shops may be intimidated by slick shared-logic system salesmen or overwhelmed by the technology. Understandably, these users prefer shopping at the less intimidating computer stores — where, unfortunately, they are often sold off-the-shelf solutions, which do not allow for a cohesive departmental direction for the future.

A silvery implementation

As a result, some implementations do not match the success of the investment firm described earlier. For example, another financial organization needed a system to process general ledger and accounts receivable transactions for its real estate division.

The management, not being systems oriented, failed to perform a needs analysis, review the requirements or evaluate alternatives. On the advice of the local computer store, the company implemented a system that incorporated five personal computers and a local-area network. After implementation, numerous operational problems surfaced, including the following:

- Long batch updates degraded the network.
 - As updates were being performed, end users were often locked out of the application.

- System integrity cor

ruptured files in several cases. Division managers failed to realize what was involved in maintaining a multiuser environment. Understanding and following procedures, maintaining manual controls and performing daily backups were foreign to them. In the end, they realized the only recourse was to start again from the top: to pull out the local-area network system and replace it with a minicomputer.

A consultant was brought in, and many of the problems were resolved with more appropriate applications software and a solid systems approach. The minicomputer alternative offered the data integrity and control that was needed for the accounting applications and that was sorely lacking with the network.

The firm's environment was high-transaction application specific, I/O dependent and required tight controls over data integrity and end-user interfacing. A detailed needs analysis would have clearly shown the shared-logic system as top choice.

Shared-fault systems

Multiuser — or shared-logic — systems are generally less flexible than personal computer-based networks but offer other strengths.

These systems utilize dumb terminals connected to a central mini or microcomputer, in which all processing occurs. At this system's heart is a sophisticated, multitasking operating system that manages the system's resources and grants all end users their share of CPU, memory and I/O resources. Shared-logic systems generally do not use intelligent workstations; where they do, the system views them as dumb terminals.

In most cases, shared-logic systems offer data integrity that is superior to local-area networks through facilities such as forward recoveries and transaction back-outs. However, when a hardware problem occurs with the central computer, the entire user community goes down until service resumes.

Furthermore, when shared-logic systems need additional capacity, they are generally expensive to upgrade. Across the board,

software is usually more expensive per package than personal computer counterparts, but one copy is licensed for use by all terminals on the system, reducing overall costs. In the end, software costs may or may not be lower per user, depending on the package and number of users.

Both local-area networks and shared-logic systems provide record-level and file level lockout, although the way that it is accomplished

is significantly different. Most shared-logic system applications enqueue or reserve the resource within the operating system or hardware. The local-area network workstation, however, issues a semaphore that requests that the server lock or unlock the resource by adding or deleting a record in a lock table at the server.

If a transaction fails after locking a resource, the shared-logic system will automatically dequeue or

Some of the industry's toughest critics say the nicest things about PARADOX



卷之三

Ansa Software's Paradox commands attention as a high-end database manager. Not only is it fast and easy to use, but it combines the best features of 1-2-3, dBASE, and Infoscope with its own to create one impressive program.

PARADOX

A DATABASE MANAGER WITH A FAMILIAR FACE

This review is unedited.
The text has been
reprinted in its entirety
from PC Magazine, Jan-
uary 14, 1986, ©1986
Ziff-Davis Publishing
Company.

For more information and the location of the Assa PARADOX dealer nearest you call 1-800-547-3888. Ask for Department No. 132. In Oregon or outside the U.S.A. call 1-800-554-3888.

pretty good products, but we want a division that has more power, has more people, is looking for a new high-end market. We've got to do something different. We've got to move, even though things are going pretty well.

Development: A major component of Lotus' strategy is to move from a marketing start-up to a company that can compete with the likes of Apple Software or Microsoft. The company's first software product, *Lotus 1-2-3*, was released in July 1983. It will work on Apple II, TRS-80, Commodore 64, and other computers. Richard Lutz, Lotus' director of development, says the company recognized the need to develop its own software and hardware. "We wanted to have control over our destiny," he says. "We wanted to have control over our best software, and we wanted to have competitive products." Lotus is marketing its products and is "very aggressive." In 12-3, which was developed by a team at MIT, Lotus claims to have a better version of VisiCalc, the most popular spreadsheet program.

Lotus' business: 1-2-3's two-line software and one-line hardware offer a range of prices from \$19.95 to \$1,295. The company's first program, *Lotus 1-2-3*, is a highly refined spreadsheet that can store and retrieve data among several files. 1-2-3 and VisiCalc are the two leading software packages that can be used to analyze data as it is exchanged between the user and his computer.

Frank J. Dyer Jr., is a contributing editor to PC Magazine.

In Depth/Multiuser Systems vs. Local-Area Networks

99

Since both local-area networks and shared-logic systems offer benefits and force trade-offs, users must determine how to compensate when the chosen solution falls short.

release the resource; the logical-area network, however, may not be available before the unlock semaphore was issued), and the system administrator may shut down the system to free the erroneously locked records and files.

Therefore, with local-area networks, workstations and end users must follow exact set rules for locking and unlocking resources. With shared-logic systems, the central operating system

manages these resources.

Unlike the shared-logic system's proprietary operating system, local-area networks allow personal computers to utilize the standard DOS operating system. This means that most user software packages that have been developed for IBM's PC-DOS or Microsoft Corp.'s MS-DOS can function on the network.

However, this does not mean that all software will run on the network in a multi-

tuser environment. In many cases, when a vendor says that the software will run on a network, users interpret the statement to mean that the software will provide record-level lockout.

The vendor may actually mean that the software will run on the network properly only as multiple single-user systems.

Evaluation factors

Knowing the strengths and weaknesses of local-area networks and shared-logic systems prepares the foundation for choosing among the alternatives. The following is a checklist of important factors:

• What applications will be used? This question is of the greatest importance. Will the system be primarily used for high-volume, transaction-oriented applications? If the system is for general use (such as word processing, spreadsheets and so on), the personal computer alternative with the local-area network will probably be more cost-effective.

If the system will be used primarily for high-volume transaction applications, then the shared-logic technology should be heavily favored. In these cases, the shared-logic systems will be more cost-effective, and the software will be more likely available for a specific application.

Local-area networks are an effective solution for automating work groups in certain situations. For example, a network-based system is appropriate for office automation or personal productivity applications that are primarily oriented toward individual users.

Category 3 systems are the best choice for these situations. Category 4 products also make sense in certain situations. For example, if you need to run a DBMS such as Oracle or Informix on a single computer, a local-area network would be the best choice. After a few reevaluates the transaction, I could select four or five fields from the database and display them on the screen. Programs could be created to handle data entry and display in less than 2 minutes.

Reporting and data access from several hosts, I found a Paradox menu selection called "Report" that allows me to define the report and write the specifications for new fields. I can then run the report and less than a minute it is up on the screen. Programming like this is not possible with the DBMSes mentioned earlier. Unfortunately, Paradox will not let you to code directly to the database. It is the nature of the database that does not allow direct manipulation of the displayed tables you get as an event to data queries. If you have made a report that has a large number of fields, it would be better to use a local-area network to display the results. Paradox will allow you to change fields around, after use of fields, and generate management reports. Paradox is good for generating reports to your database needs.

Paradox has an extensive menu display that will allow you to map the display as many of the fields available and others you may want to use. Paradox is good for generating reports or in ability to create customized formulas that apply to only one record.

Paradox goes beyond 12.1's database capabilities, to much more advanced features. For example, Paradox's DBMS is not limited to one table at a time and no more data than can be held in RAM. It is also able to read and write to a PC's memory, the Paradox Application Language (PAL), which has a syntax and program-

structure similar to that of the dBASE language. PAL's commands are often simpler or easier to enter than the corresponding dBASE command.

If you are a dBASE person, you can quickly create permanent indexes in your data base by simply key stroke typing; you need these:

1-2-3 Multiuser users will find familiar the concept of a local-area network, which uses the second line to replace the feature highlighted in the top line of the menu bar. The second line is the network methods used to access the menu in these 1-2-3 and Multiuser, but you might be surprised to learn that the menu in the 1-2-3 and Multiuser menus is the same as the key instead of the menu bar. The F1 (Help) key brings up screens of text that follow the 1-2-3's pattern of allowing you to choose the menu item you want to use. Paradox has even supplied a local menu. Paradox's menu is much more complex than the 1-2-3's menu, but it is very similar to the one in the 1-2-3's menu. The 1-2-3's menu includes key assignments in the A4 and on-theshelf.

Like 1-2-3's own previous versions, Paradox's primary feature uses a query-like interface that lets you to write commands to the system to tell it what you want to do. Paradox's commands are very similar to the commands of the PC's display, whether color or monochrome. It is a very complete DBMS language, and it is also a very complete language. Paradox's DBMS language is SQL. It is very easy for anyone to learn BASIC or Pascal to use.

Paradox has execution functions for creating the program and command file that can be run on the PC. Paradox has a lot of built-in functions that can be used to manipulate the PC's display.

This on-screen editing is as close to using the PC's display as is possible. You can move around the screen, scroll through the menu, which is like moving through a stack of > 300 cards, and move around the screen or change data with a simple command. Paradox has a good editor, a good parser, and a good editor for the command part of the database.

You can also use the on-screen display to edit the command part of the database.

Paradox has a good editor, a good parser, and a good editor for the command part of the database. Unfortunately, Paradox will not let you to code directly to the database. It is the nature of the database that does not allow direct manipulation of the displayed tables you get as an event to data queries. If you have made a report that has a large number of fields, it would be better to use a local-area network to display the results. Paradox will allow you to change fields around, after use of fields, and generate management reports. Paradox is good for generating reports to your database needs.

The program also has an extensive menu display that will allow you to map the display as many of the fields available and others you may want to use. Paradox is good for generating reports or in ability to create customized formulas that apply to only one record.

Paradox goes beyond 12.1's database capabilities, to much more advanced features. For example, Paradox's DBMS is not limited to one table at a time and no more data than can be held in RAM. It is also able to read and write to a PC's memory, the Paradox Application Language (PAL), which has a syntax and program-

structure similar to that of the dBASE language. PAL's commands are often simpler or easier to enter than the corresponding dBASE command.

If you are a dBASE person, you can quickly create permanent indexes in your data base by simply key stroke typing; you need these:

1-2-3 Multiuser users will find familiar the concept of a local-area network, which uses the second line to replace the feature highlighted in the top line of the menu bar. The second line is the network methods used to access the menu in these 1-2-3 and Multiuser menus. Armed with the appropriate software, anyone familiar with the PC's display can be effectively using Paradox in minutes.

I was able to do complete work with Paradox in about 10 minutes. I was able to work with the program, I was still finding bugs in the program, but I was able to accomplish the kind of work that I had done in the 1-2-3 and dBASE areas. Armed with the appropriate software, anyone familiar with the PC's display can be effectively using Paradox in minutes.

Paradox has execution functions for creating the program and command file that can be run on the PC. Paradox has a lot of built-in functions that can be used to manipulate the PC's display.

This on-screen editing is as close to using the PC's display as is possible. You can move around the screen, scroll through the menu, which is like moving through a stack of > 300 cards, and move around the screen or change data with a simple command. Paradox has a good editor, a good parser, and a good editor for the command part of the database.

You can also use the on-screen display to edit the command part of the database.

Paradox has a good editor, a good parser, and a good editor for the command part of the database. Unfortunately, Paradox will not let you to code directly to the database. It is the nature of the database that does not allow direct manipulation of the displayed tables you get as an event to data queries. If you have made a report that has a large number of fields, it would be better to use a local-area network to display the results. Paradox will allow you to change fields around, after use of fields, and generate management reports. Paradox is good for generating reports to your database needs.

The program also has an extensive menu display that will allow you to map the display as many of the fields available and others you may want to use. Paradox is good for generating reports or in ability to create customized formulas that apply to only one record.

Paradox goes beyond 12.1's database capabilities, to much more advanced features. For example, Paradox's DBMS is not limited to one table at a time and no more data than can be held in RAM. It is also able to read and write to a PC's memory, the Paradox Application Language (PAL), which has a syntax and program-

language that is very similar to the PC's display — not the network.

Intense spreadsheet applications, for example, are CPU intensive with little I/O, so they are usually better implemented on a network-based microcomputer system. The workstation that is processing the application

PARADOX

In Depth/Multiuser Systems vs. Local-Area Networks

will experience CPU degradation, but that will not affect other users on the network.

If the system is I/O bound, it is probably high volume and application specific and belongs with the shared-logic alternative. Since I/O-intensive applications are constantly calling upon the file server for records, a slow file server will bog down every workstation on a local-area network.

3. If data sharing and data integrity is the desired goal, then local-area networks tend to be less than satisfactory. The hardware and software environments available for shared-logic systems are better able to manage concurrent requests for information from data bases. Many of the shared-logic alternatives, besides providing file and record locking, offer transaction logging and re-

covery facilities that, unfortunately, have been overlooked by the publishers of personal computer software.

4. If peripheral sharing is the primary requirement, a local-area network would be the preferred alternative. Sharing resources is a primary need for many organizations for convenience and cost reduction. It also provides an expandable environment for growth. As the environment for growth grows, the incremental cost of adding resources is relatively low.

Expanding a shared-logic system, however, can be costly and would greatly complicate changes in the configuration. The system may require a complete change of the CPU or changes to the operating system environment that cause ongoing problems to the users.

5. If ease of applications devel-

opment is a major requirement, in most cases, the personal computer-based local-area network solution would be the first choice. Personal computer software has traditionally offered the user greater ease of use, and it is now graduating to the multiuser world. Multiuser productivity systems such as the recent releases of Fox Research, Inc., multiuser Share 5000 and Ashton-Tate's Database III/Plus now will allow many stand-alone applications to be converted to multiuser environments, and the existing user base means expertise in these products is already available.

However, shared-logic system vendors have seen the impact of the easy applications development tools available for the personal computer; many fourth-generation languages, which provide greater ease of use,

have been developed for shared-logic systems using popular operating systems.

6. If system growth is an issue, the personal computer with local-area network solution wins again. Local-area networks are designed with it in mind to upgrading. As you add users on a shared-logic system, each gets a smaller slice of the existing CPU and main memory pie. Eventually, when the system runs out of resources, expensive replacements or upgrades are required.

When workstations are added to a local-area network, degradation is minimal because each brings its own CPU resources with it, instead of draining the central shared-logic processor. When network performance does degrade, it is usually due to contention (long queues of I/O requests) at the server.

To compensate, many local-area networks allow multiple servers to be added inexpensively within the same transport level. Server contention is relieved by migrating some of the I/O to the secondary server or servers. Secondary servers also provide the user some redundancy, which proves valuable if the primary server fails. Isolating applications to servers prevents an entire department from grinding to a halt during a crash, since the applications and data on secondary servers are still available for some users.

7. Where all the users are widely dispersed among several buildings, a local-area network generally is not appropriate. Recently, however, some providers introduce microwave and infrared links for that purpose, which may be an option.

Traditionally, shared-logic systems provide for wide-area access. However, all cables must go back to the central host, and if the users are in a different building from the computer, expensive multiplexers and telephone circuits are required.

Local-area networks are made for use within a building. With a local-area network, all the pieces of the system — the server, workstations and so on — can be located in the same area as the server, and often only one cable needs to be dropped between floors.

8. If remote access (dial-up) is frequently required, then the shared-logic system alternative is best. Local-area networks are oriented toward use over limited distances — generally within a building. Although remote access to a local-area network is available, performance is generally poor, and users are required to carry special diskettes with the network operating system and programs.

9. Does management want end users to control the data? In many corporations, although departmental managers want the data to be controlled by their end users, MIS managers often want all of the information secured in one location. A local-area network requires that management allow data to be decentralized and placed under user control.

Often, because of security or auditing reasons, decentralizing data under user control is not a viable approach. Consequently, management may choose a shared-logic system because the central computer, its tapes and disks can be placed in a highly secure data center.

10. Will the end users take responsibility for the data and for

A \$1495 PC/AT?

**Is This a Joke?
A★Hoax?
A★Trick?
A★Put-On?
A★Spoof?
A★Flimflam?**

No, it's an AxStar™! And, unlike most of its would-be competitors, it's none of the above. What it will astonish you! At \$1495*, AxStar is by far the lowest priced PC/AT compatible on the market. But, it's not just another clone, it's better!

AxStar™ runs 30% faster than most AT's, has twice the memory and eight available expansion slots; theirs has only seven. Plus, AxStar is so "compatible" it's backed by an exclusive money back guarantee. Better yet, AxStar is the only "network ready" AT you can buy...at any price.

But that's not all. AxStar™ is also the only PC/AT compatible made in America by an American Stock Exchange manufacturer. And that's real peace of mind when you consider the unknown origin and quality of many of the cheap, import imitations.

A★Star™ It's about time! And...it's from Wells American.



Wells American

3243 Sunset Boulevard • West Columbia, South Carolina 29169 • (803) 796-7800 TWX 510-801-2645

*Second unit price. Call us for first unit pricing and guarantee details. You'll be amazed.



*"If we're going to
plug a hard disk into
everyone's PC, we
should max out the
RAM, too."*



*Turn your PCs into serious machines.
With FileCard™ it gives you a 10MB
hard disk and an on-board option of
up to 512K extra system RAM. Low,
low power means you don't have to
upgrade power supplies, either.*

WESTERN DIGITAL
ENHANCED PERIPHERALS

Western Digital Corporation, Enhanced Peripherals Division
2445 McCabe Way, Irvine, CA 92714. For information: (714) 853-7257.
FileCard is a trademark of Western Digital Corporation.

**"We should take a close look
at The Cullinet
Manufacturing System."**

**"Its three-level integration
would put us way ahead of
our competition."**



***Because the Cullinet Manufacturing System is an
Integrated manufacturing solution...***

...it delivers visibility and control over the entire organization. Through its exclusive multi-plant capabilities the Cullinet solution delivers the ability to meet each of your location's individual requirements regardless of the number of plants, warehouses or cost centers—unique bills of material, routings and even work days can be established for each.

The Cullinet Manufacturing System also recognizes the interdependencies between plants and automatically plans for transfer of goods to required locations while maintaining visibility of stock in and between locations.

The Cullinet solution is also designed to allow you and your managers to focus on the most critical tasks in the manufacturing environment. Tasks such as designing new products, planning and maintaining realistic production schedules and making cost effective purchase decisions. Cullinet's innovative online capabilities eliminate non-productive tasks by delivering powerful productivity tools like our mass update or replace feature, online part cross referencing and final assembly scheduling. The result is shorter implementation schedules and the cost benefits and productivity gains you demand from a comprehensive manufacturing planning and control system.

The Cullinet Manufacturing System is used in many different environments: discrete manufacturing; repetitive manufacturing where production is more likely controlled by schedules and materials are automatically issued to the floor; and government contracting where requirements for unique bills, specific materials and serial number control is essential. Only with Cullinet's truly integrated Manufacturing System that incorporates Master Production Scheduling, Order Entry, Bill of Material, Materials Requirement Planning, Inventory Control, Purchasing, Shop Floor Control and Cost Control, all working together, can a manufacturer successfully implement the capabilities needed to be ahead of the competition.

***Because the Cullinet Manufacturing System has an
Integrated Information center...***

...it provides easy access to all pertinent facts so that informed decisions can be made. Frequently, the manufacturing planner needs to analyze information from multiple sources whether it resides on the mainframe, departmental minicomputers or on personal computers. For example, Cullinet's Information Center Management System's micro to mainframe integration allows the manufacturing planner to associate information about sales orders, finished goods status, capacity requirements and a wide variety of other production and engineering information, and download it to their personal computers for analysis when developing production schedules. Only by means of Cullinet's unique approach to integration, where our manufacturing solutions are completely integrated with our Information Center Management System, are you provided the tools you need to create a complete Manufacturing Information Center.

***Because the Cullinet Manufacturing System has an
Integrated database foundation...***

...it provides the ability to respond quickly to changes in the business environment. Database management is the foundation of a complete information system. IDMS/R, Cullinet's advanced relational DBMS is the foundation of Cullinet's approach. Its advanced architecture ensures accuracy and completeness of all data, provides security and delivers the performance required in today's real time environments. IDMS/R is the means by which all information is shared among the manufacturing solutions and delivered to the Information Center. Cullinet's Application Feature Generator allows you to make Cullinet's Manufacturing System into a unique solution for your organization. It permits both your users and MIS to easily tailor the system to meet today's unique requirements and build in new functionality to address the changing needs of tomorrow—quickly and easily—and put them to use immediately.

Cullinet's complete manufacturing solution is based on this three level integration. The result is a comprehensive Fourth Generation Manufacturing system that delivers the tools you need to address today's most critical business requirements, make decisions on the latest information and respond to the challenging environment of today and tomorrow. Only through the complete integration of Cullinet's **manufacturing solutions** with its **information center** and **database management system** can you gain a lasting competitive advantage.

For further information about Cullinet's Manufacturing System call our toll-free number 1-800-551-4555 today.

The Leader in Information Systems Software

Cullinet
© 1988 Cullinet Software, Inc., Westwood, MA 02090 USA

In Depth/Multiuser Systems vs. Local-Area Networks

the operations? Implementing either alternative requires a commitment of responsibility from them. With local-area networks, end users must take the responsibility for performing backups on a timely basis.

A local-area network needs care and feeding. Depending upon the size of the network, a part-time or full-time administrator must be appointed to be responsible for the resources. Network administrators make sure that resources are equitably distributed among users. They also provide data integrity functions (backup, restores, and so on) and are available to help new users operate on the network.

One of the biggest problems local-area network users encounter is the need for more and more disk storage. Network users must take responsibility for space management and ar-

chive, on diskettes or tape, the files that they will never again use.

Centrally controlled shared-logic systems are more appropriate in situations where users are unwilling or unable to take responsibility for system operations. Trained, professional operators, using appropriate procedures and controls, make sure that the systems are properly backed up and that resources are managed well.

11. Are gateways to other computers required? At the present time, only limited communications gateways are available for local-area network-based systems. At this time, application sharing and interconnection of other large-scale systems are probably better implemented on a shared-logic system that includes the appropriate distributed communications software and controls.

The world's most experienced UPS manufacturer now offers computer protection "From micro to mainframe."



Emerson Electric Co. is the most recognized name in UPS both in the U.S.A. and worldwide. With the largest line of installed systems in the world, Emerson has maintained a consistent sales leadership position for over 20 years.

The critical need for *Uninterruptible Power* has now extended down from the mainframe computer into office, mini, and now micro applications.

Emerson has responded to this need by introducing an array of new products to cover all critical power requirements.

All the products meet Emerson's high standards for quality, reliability, low price, and user-friendly benefits. Such as power monitoring status and simple start-up controls.

AP500 Series (Mainframe)¹

From 50 kva modules up to 4000 kva systems, Emerson's 500 Series systems provide *Uninterruptible Power* for many major DP sites and critical load needs throughout the world.

AP300 Series (Minis)²

These new 15 & 30 kva three phase systems with

From 200 VA all the way up to 4000 kVA

full monitoring functions, and can meet many power distribution needs.

AP100 Series (Micro)³

With single phase ratings of 3, 5, & 10 kva, the new AP100 Series brings a complete UPS into the office environment to cover a wide number of mini systems requirements. It's quiet, has self-contained batteries bring quiet, convenient utility power into the DP room environment at lower costs than ever. The 15 kva provides full UPS for IBM System 38 users.

AP1000 Series (Minis)³

With single phase ratings of 3, 5, & 10 kva, the new AP100 Series brings a complete UPS into the office environment to cover a wide number of mini systems requirements.

It's quiet, has self-contained batteries bring quiet, convenient utility power into the DP room environment at lower costs than ever. The 15 kva provides full UPS for IBM System 38 users.

AP1000 Series (Micro)⁴

Emerson's newest addition provides micro and personal computer protection from 1500 watts down to 200 watts.

And, it's backed by Emerson's history of quality and experience.

For more information on the most complete line of UPS systems available, call 1-800-BACKUPS.

Emerson Electric Company, Industrial Controls Division, 3300 South Standard Street, Santa Ana, California 92702, (714) 545-5581 Telex 67-8460

EMERSON
Computer Power

The World Leader in Uninterruptible Power Systems and Service

© 1985, Emerson Electric Co.

A shared-logic system, for instance, would work better for a company with many divisions developing financial information to be ultimately consolidated in a corporate center. In this case, distributed communications among the different computers may be important both to ensure that data is transferred on a timely basis and that only accurate data is maintained in each system.

In the future, with the implementation of the kind of Advanced Program-to-Program Communications that IBM envisions, local-area networks should be able to provide similar integrity and control among systems and different networks.

12. Will the network connect many different vendors' products? With a local-area network, the best and most cost-effective solution can be chosen for each application while maintaining a compatible environment for sharing resources and information.

For example, many companies are installing Apple Computer, Inc. Macintoshes for in-house publishing. They still want to develop documents on IBM Personal Computers but would like to transfer them to the Macintosh for final printing. Some networks, such as those from Corvus Systems, Inc. or 3Com Corp., allow both Macintoshes and IBM Personal Computers to hook up to the same network so end-users can transfer files from one to another. The different computers can also share disk storage and printers.

Standards being implemented for local-area networks will enable a variety of hardware vendors to interconnect and share data, applications and resources through strictly defined interfaces. However, in most cases, shared-logic systems still confine the user to the system's proprietary devices, with minimal connectivity to other vendors' devices.

Minimum costs

In evaluating departmental computing alternatives, managers must consider a variety of criteria. Cost of acquisition is a consideration of primary importance; however, it should not be weighted as heavily as other system requirements.

Once acquired, hidden costs are overlooked when comparing options. Hidden costs include ongoing maintenance and support charges over the life of the system, as well as costs for upgrades and new releases of system software.

Shared-logic systems need sophisticated maintenance contracts so that they can be quickly repaired with minimal downtime; in most cases, personal computers and systems are designed so that if a personal computer fails in a network, it can be swapped with a spare while the original is being repaired at a shop.

Methodology for analysis

An objective needs analysis must be performed from the start. It is essential for decision makers to compare the following steps:

- Understand the overall systems architecture and organization which have established some type of strategic direction for information processing, and this direction must be considered and related to the available range of options.

Sometimes this mandate provides viable alternatives for a particular problem. Unfortunately, it can also

THE INFORMATION PUZZLE:

Does this sound familiar? Different kinds of data...different kinds of computer hardware...accessed by a variety of users. That's today's corporate information puzzle. FOCUS has the *abilities* to provide a solution. Here's how:

Use-Ability

The FOCUS fourth generation language covers all your users...from novice end users to trained DP professionals. Since it operates interactively via plain-English commands, ad hoc queries and reports are easily produced by non-technical end users. And trained programmers can use FOCUS to build complete applications up to 10 times faster than with COBOL or PL/I.

Read-Ability

Only FOCUS reads every file in your data center, with a single protocol, eliminating costly conversions and data extraction. Plus, its unique Universal Join lets you dynamically combine data from separate files for ad hoc information needs.

Port-Ability

FOCUS applications are fully portable across all your computer environments...including IBM or compatible mainframes, DEC/VAX and WANG VS departmental computers, and PCs. This eliminates the costly retraining of personnel, insuring a growth path as your applications increase in size.

Connect-Ability

FOCUS allows users of your IBM and compatible mainframes, your DEC/VAX and WANG VS departmental computers, and your PCs to access, share and/or transfer data from each others' computers. The barriers between different computer environments dissolve. Your network is maximized. And you are able to support future growth!

The powerful FOCUS language provides a rich set of integrated decision support facilities including graphics, spreadsheet, financial modeling and advanced statistical analysis, allowing you to put the pieces of your information puzzle together, at last.

Find out more now. For complete technical details, call the IBI office nearest you or write to Donald Wszolek, Information Builders, Inc., 1250 Broadway, New York, NY 10001.

Only
the 4GL/DBMS
abilities of
FOCUS can put it
all together!



FOCUS: One language. One solution.

Information Builders, Inc.

New York: (212) 736-4433 • Washington, D.C.: (703) 276-9006 • Chicago: (312) 789-0515 • St. Louis: (314) 434-7500
San Jose: (408) 293-6600 • Los Angeles: (213) 645-0735 • Houston: (713) 952-0260 • Boston: (617) 272-8600
Dallas: (214) 490-1300 • Atlanta: (404) 980-0874 • Toronto, Canada: (416) 364-2760 • London, England: 903-6111

In Depth/Multiuser Systems vs. Local-Area Networks

needlessly restrict viable options for the department.

For example, one financial company dictated that all office functions would be provided through a series of Wang Laboratories, Inc. minicomputers with word processing workstations. However, the financial analysis department needed a powerful personal computer-based system to operate its Lotus Development Corp. spreadsheets.

In this case, a personal computer-based local-area network solution would have been more appropriate because the financial analysis department could print spreadsheets locally and use less expensive hardware and software. But the right alternative could not be implemented because a limited, strict architecture defined by the organization resulted in increased cost, reduced reliability

and a very complex environment.

The trade-off between an individual department's needs and those of the organization must be considered. Will the individual department's approach conflict with the organization's overall architecture by not being connectable or compatible? Or do the specific needs of the particular department make it unique, for example, in its processing requirements? This question often becomes a management issue that needs to be resolved internally.

- Analyze user requirements to determine the level of program and information sharing. A portfolio of functions and applications for each user should be developed. This step is critical to the analysis because it will become the basis for determining storage requirements and the amount of workstation power required for each user.

User surveys and interviews should be conducted to determine the mix of functions and whether the user performs repetitive, structured work or ad hoc, unstructured work. Logs are also useful to document the time spent on different tasks to determine priorities and frequency of use. The user's future needs will also become apparent.

The process is two-way: educating users about their possible options and finding out which ones fit. For example, many users want an electronic mail system. But do they really need E-mail? In many cases, a shared storage volume may be all that is required for work sheets and other documents they want others to see.

Analyzing source documents, current computer usage and communication with other users and depart-

ments will help to determine what categories of information are being used (text, graphics, numeric data, voice and so on) and to what extent information is shared with other users.

The primary sources of information will need to be identified. Are they all within the same department, on the corporate mainframe or external to the organization? It is important to determine whether users need to communicate frequently with other departments. A flowchart may be needed in some environments.

- Determine security requirements. In evaluating security needs, access requirements need to be addressed, and the option need to be reviewed. For example, is access security sufficient or are users to be prevented from accessing specific files on the system?

- Review the physical environment. Its constraints and requirements must be documented. An inventory of the installed base of equipment and physical requirements must be made. Are all the users in the same building or on the same floor? Do specific restrictions exist? Is the building an explosives factory that requires the use of fiber-optic cables?

It must be noted whether there is any previously installed equipment and whether its usefulness can be preserved. All current hardware must be identified to determine the incremental investment required.

Impact of future change

The gap between the local-area network and shared-logic system approaches for end-user computing will close as departmental computers gain strength in the marketplace. This hybrid approach will take the strengths of both systems and combine them into an environment that can provide an integrated solution for end-user computing.

As the market grows more powerful within personal computers, it is possible that the personal computer will become a shared-logic system connected to the local-area network, that in turn is connected to a mainframe — and a limited number of dumb terminals can connect to it. The list of future connectivity options can grow endlessly.

For example, the departmental computer will function as both a server for the local-area network and an application processor. The departmental server can then users will be able to share disk storage on the departmental computer and also run applications on a server while using their workstations as terminals.

More software will appear on the market for local-area network-based multiuser systems, and the data integrity features lacking on local-area networks will be implemented. Local-area network managers are also learning their systems to provide hardware redundancy with advanced integrity features.

In time, shared-logic systems that run applications and work as file servers for a local-area network will become available, which will enable users to take advantage of the best of both alternatives. In the meantime, organizations must position themselves for flexibility, providing users with a solution that works but also one that is expandable and can accommodate new technology as it is introduced.

Who Dictates Your Data Storage Management Philosophy?

YOU... or your SOFTWARE?
Some DASD management systems automatically determine the placement of data sets in your storage hierarchy... shouldn't you be in control, instead?

When automation gets the upper hand, it can hamper your data accessibility and cost you more in hardware, user time, and machine throughput.

DMS/OS is the DASD Management System that puts you in control. Once you establish your data storage strategy, you tell DMS/OS how to manage data set residency... then the automation becomes your servant, not your master. That's the way it ought to be.

DMS/OS gives you the flexibility to establish data management standards based on your needs. It allows you to manage space differently depending on the kind of data you have and how it is used.

Over 1,200 users worldwide use DMS/OS for controlled, DASD management. For a free, 30-day DMS/OS trial, at your site, call 800-824-8512 or 916-635-5535.

DMS/OS's comprehensive reporting lets you see:

- Who uses the data
- What data is being used
- Where data is stored

This lets you decide:

- When data is no longer needed
- Where it should reside for maximum cost-effectiveness
- How it should be managed for best performance

Flexible standards enforcement for:

- | | |
|--------------------|-------------------|
| Archival | Reporting |
| Migration | Backup |
| Compression | Disaster Recovery |
| PDS Management | plus more... |
| Idle Space Release | |

DMS/OS


**STERLING
SOFTWARE**
 Systems Software Marketing Division
 1040 Mission Road, Suite 200
 Rancho Cordova, CA 95670-8095

In Depth

Lawsuits may choke U.S. software industry



ILLUSTRATION BY GARY SCOTT

Since we are by nature imperfect, lots of things go wrong. But a tort law system that holds the software vendor liable for every accident or clumsy purchase under a strict liability doctrine is killing the industry's entrepreneurial spirit.

By RICK MARTIN

Did you ever buy software that didn't work? I'll tell you what. Why don't you sue the son of a gun who sold it to you!

I bet if all of us who have purchased imperfect software got together and sued all the software vendors, we could close down everybody in the software business except IBM. Wouldn't that be great? Imagine, only perfect software made by IBM would be on sale in the U.S.

More than 10,000 businesses employing more than half a million Americans would disappear. Unemployment would climb. Plentiful supplies of low-cost software packages would no longer be available to U.S. computer users. The U.S.' international economic competitiveness would decrease. More jobs would be lost. Computer hardware sales, which rely on readily available applications software, would plummet and cause a national depression.

Does this sound like an international plot to overthrow the United States of America? Well, it isn't. We are doing it to ourselves. The entrepreneurial spirit that built this nation is being killed by a fatally defective tort law system. Clumsy purchasers, accident victims, and contingency fee lawyers will soon seem to rule the nation.

What is a tort? In a nutshell, it is anything that goes wrong that is not criminal. That includes most airplane disasters, car crashes and faulty software.

Since we are by nature imperfect, lots of things go wrong. Therefore, we are surrounded by torts. The deep, philosophical question that Americans must face up to is this:

If I become a victim of a technology-based disaster such as faulty brakes, should I become a wheelchair millionaire, or should I receive free medical service and return to as productive a life as possible?

Please vote on this question soon. But before you vote, read on.

America means progress. Progress means creativity. Creativity means jobs. In this half of the world, jobs exist only if they help create a reasonably competitive product or service. When the employer has to pay millions of dollars to those who suffer from bad

dreams ("pain and suffering" in legal terminology) or lack of sex ("loss of consortium") because of the use of his product, then the employer can no longer create a reasonably competitive product.

Things are so far out of hand that the new president of the American Bar Association predicts a national super-fund may be needed to insure all businesses against monumental lawsuits. This would add another unbearable burden to the federal deficit. Good-bye America.

In the Old West, while the U.S. was bursting with growth, energy and creativity, if you shot your foot off while horseback riding, you limped for the rest of your life. Today, you hire a contingency fee tort lawyer and choose one of these options:

- Sue the gun manufacturer for a defective product under a strict liability doctrine.
- Sue the stable for supplying a defectively bumpy-riding horse on a negligence theory.
- Sue the city for negligently landscaping the park and placing a rock on the spot where you fell.

You will become a limping millionaire. You will become a winner in the "U.S. tort law lottery system."

Killing small business

Two destructive economic shifts are occurring as a result of our tort law lottery system. The worst effect is the killing of small businesses. A number of years ago, there were 30 or more small manufacturers making football helmets. Product-liability lawsuits have driven most of them out of business. Today, there is only a handful.

There were more than 400 verdicts awarding \$1 million or more in damages during 1984. Small businesses cannot afford adequate insurance to cover million-dollar lawsuits. Big businesses can. In one fell swoop, big business kills small local businesses, while large overseas competitors take over the market.

The second tragic effect of our tort law lottery system in the U.S. is the withdrawal of useful products and services from the market.

One famous gynecologist stopped delivering babies because his obstetrics malpractice insurance cost \$120,000 per year. He needed to deliver 200 babies a year just to meet his office expenses.

The U.S. has lost the services of one of its most highly trained medical experts. He cannot deliver babies in this

Martin is an attorney with the firm of Oltman and Flynn in Fort Lauderdale, Fla.

In Depth/Lawsuits and the Software Industry

country because God has not made the procedure foolproof. We cannot repair the U.S. tort law lottery system overnight. But we can zero in on helping the U.S. software industry rather painlessly. It is in the best interests of the U.S. to restrain governmental regulation in the computer services industry.

Make it a "service"

An ideal place to start is to define all of the computer services industry, including software creation, as a "service." This would protect vendors from lawsuits based on implied warranty or strict liability doctrines. That means that vendors cannot be sued unless they lied to customers or were negligent when they wrote the software.

Quite frankly, it is very possible that software is going to kill lots of

If I become a victim of a technology-based disaster such as faulty brakes, should I become a wheelchair millionaire, or should I receive free medical service and return to as productive a life as possible?

99

people in the near future. Today, software malfunctions primarily foul up sales reports and ledger sheets. Tomorrow, industrial robotization will change all that.

As computers become more and more involved in daily physical processes such as in home security systems and farther away from simple number crunching, the danger of physical harm resulting directly from software error grows. Future

software-based airline traffic control systems, medical electronics, robotic hazardous waste disposal systems and superhighway automotive guidance systems will malfunction and actually kill people.

Several of these futuristic systems are technologically feasible now. Massive local reforms are needed, however, before they become economically feasible in the U.S.

Without such reforms, foreign na-

tions will zoom past the U.S. in technological efficiency and available jobs. The U.S. is the only nation in the world that allows lawyers to share fees with accident victims. This nation must balance the benefits that automation provides to society against the inevitable personal tragedies that high-tech living entails.

Queen for a day

Today, no jury considers how many lives an ambulance has saved. It only considers the injuries caused by one failure of one tire on the ambulance's last run.

But technology has increased human life expectancy 40 years in many developing nations to more than 70 years in high-tech nations such as the U.S. So if you're over 40, you already owe your life to entrepreneurial scientists who commercialized ambulances, penicillin, fertilizers and catalytic converters.

We have no natural right to dismember our nation economically because the life support system it gave us eventually will fail. Inflatable limitations in all areas of technology. The *Miami Herald* measured technology's price in a Jan. 30 article, "Harsh Lessons in Human Frailty," in this way:

"Like the *Titanic* sinking and the *Hindenburg* disaster, the shuttle explosion was a chilling reminder that technology — given of longer life spans, miracle cures, wondrous machines of communication and travel, enchanting consumer products — is ultimately a flaw in its design."

Yet every day compassionate juries play queen for a day and try to repair broken lives by awarding millions of dollars to accident victims and their lawyers. If small businesses in the U.S. are going to exist into the next century, limits are going to have to be set through federal legislation on all product liability and general liability awards.

Various other reforms — including abolition of joint and several liability, courtroom delay tactics and mandatory self-insurance for personal injury — are all in the offing.

For now, this article proposes a very humble legal reform. Treat America's software as we do America's blood. Blood has been legally shielded from the national tort law lottery system by specific statutes in 44 states. If you sell whole blood, you cannot be sued unless you lie about what you are selling or unless you negligently infect someone. If the buyer of the blood dies from undetected serum hepatitis in the transfused blood, then the blood vendor cannot be sued.

God has not allowed man to guarantee that blood does not have deadly hidden impurities. Lawmakers have come to the proper conclusion that society is better off with imperfect blood than not blood at all. Ceteris paribus, software fits in to the U.S. software industry; after all, God has not allowed man to produce perfect software either. The U.S. is better off with imperfect software than with none at all.

The flourishing software industry in the U.S. represents a great source of innovative technology. Today's personal computers streamline numerous sectors of our economy, contributing to the lives of students, engineers, scientists, businesspeople and lawyers. But continued success depends on the cottage industry of

Communicate with the stars at Interface '86.

The stars of the communications and information industries can make you a star. Because the decisions you make today about data communications, telecommunications, and information networks will decide your company's tomorrow.

And to make those decisions, you need the right information. Over fifty conferences led by industry experts will cover the spectrum from global issues to VANs and LANs; SNA, X.25, LU6.2, MAP/TOP, ISO/OSI, and X.400; PC nets and micro-to-mainframe links; applications-oriented case studies and product updates; and building gateways or building your own telephone company. And to give you an insider's view of policy, regulatory, and management issues, recognized authorities including Keynoter James E. Olson, AT&T President and Chief Operating Officer, will reveal late-breaking strategies.

All this information and a constellation of exhibitors' innovations can be yours March 24 - 27, 1986, at the Georgia World Congress Center in Atlanta.

So be a star. Fill out and return the coupon to The Interface Group, Attendee Registration Department, 300 First Avenue, Needham, MA 02194, or call (617) 449-6600 for a registration package.

Yes, I want to be a star.
Send me a complete INTERFACE '86
registration package.

Name _____

Title _____

Company _____

Telephone _____

Address _____

City/State/Zip _____

INTERFACE '86

In Association with
BusinessWeek
and
Information Week

©1986 The Interface Group, Inc.



Doesn't your IBM PC deserve IBM service?

You chose an IBM Personal Computer for lots of good reasons. And now that you depend on it to help keep your office running smoothly, doesn't it make sense to help protect your investment with blue chip service from IBM?

No matter what IBM PC you have, blue chip service is more than just expert repair.

Blue chip service offers the choice of service that's right for you at the price that's right for you. It means we'll exchange your monitor, for example, at your place or at any of our Service/Exchange Centers.

And blue chip service means a lot of things you don't see. Quality. Speed. Commitment. And IBM experience. Every year IBM invests many hours of training to keep its service representatives current on technologies that never stand still.

As an IBM customer you deserve blue chip service. It's the best thing you can do for your IBM Personal Computer.

For more information, use the coupon or call 1 800 IBM-2468, Ext. 90, and ask for the Service/Exchange Maintenance Department.

Blue chip service from

IBM

IBM Direct
Service/Exchange Maintenance Dept.
One Calver Rd.
Dayton, NJ 08810

Please send me more information on IBM PC service.

Name _____ Title _____

Company _____ Phone _____

Address _____

City _____ State _____ Zip _____

In Depth/Lawsuits and the Software Industry

small software vendors. The growth of the personal computer hardware industry reflects directly on the output of thousands of small software companies.

IBM responded to this challenge by breaking its major employee relations precedent. It created an incentive program whereby IBM employees could earn extra money by writing programs for IBM's Personal Computer. That one management decision broke the heretofore

ironclad rule of "no moonlighting" for IBM employees. More significant, it unleashed more than 100,000 potential entrepreneurs into the software services industry.

But the imposition by the federal government of hidden Uniform Commercial Code (UCC) warranties onto this new activity can create additional legal and liability costs resulting in a slowdown in a vital industry. It is not healthy for the U.S. to

perpetuate the fate of the football helmet manufacturers onto the software industry. Even the high growth rates anticipated for hardware cannot be achieved without an abundant supply of software.

Additionally, a key difference exists for our society between software and every other technological advancement. Software can be produced by anyone. The future offers more and more ease of programming. Thus, in a few

years, Grandma may load her famous recipes onto diskettes and sell them through computer stores! All other high-technology products are more difficult to produce and difficult to produce, engendering the pattern of mergers, acquisitions and giant manufacturing corporations. These giants can afford to insure for many of the injuries they create. Grandmas cannot.

Forty-four of the 50 states modified the UCC to exclude

donated blood from the implicit warranties that apply to other traded goods. Using the structure in Illinois Statutes, Title 91 Section 181, I propose a statute for limiting liability in the data processing services industry in a parallel way.

The availability of knowledge in the science of automation, skills, software and related services for the purpose of automating society through data processing is important to the health, welfare and economic well-being of America's people. The imposition of legal liability without fault upon the persons and organizations engaged in such automation procedures inhibits the exercise of sound business judgment and restricts the availability of important automation knowledge, skills, services and materials.

I hope therefore the public policy of this nation to promote the health and welfare of the people and the economy by limiting the legal liability arising out of such automation procedures to instances of negligence, willful misconduct, tortious misrepresentation or breach of express warranties.

Who should pay?

The major policy question for the courts and legislatures to answer is, Who should pay for America's computer learning curve — the customers (200 million people) or the data processing services industry?

Clear thought on this question can lead to only one conclusion. A small entrepreneurial, high-technology services industry cannot afford to finance the U.S. "love for the computer."

Any effort to define services as "goods" in order to impose government-enforced hidden warranties can lead only to a slowdown in the rate of technological progress for the U.S. Only large corporations with high-end-user prices and the high end-user prices that result will enter the market, and they will be selective, restricting their activities to small, lucrative portions of the market. Thus, in large segments of the American economy, a shortage of cost-effective software will slow automation projects.

The answer is the combination of freedom of contract and ample common-law remedies can allow adequate end-user protection, while creating the environment for the U.S.' successful transition to an information society. For now, however, sound advice for computer service vendors is to use a formal contract-preserved affidavit government-imposed hidden warranties.

Now you can vote. Plan for progress or continue the U.S. tort law lottery system? ■

Looking for the first CICS applications development tool that's as versatile as you are?



As a data processing manager, you wear a lot of different hats. Constantly balancing programmer resources, machine resources and time demands to get a lot of different jobs done.

That's why you need CONSENSUSTM from Martin Marietta Data Systems. The first on-line applications development tool designed to let you develop applications three different ways and in whatever operating environment you choose.

With CONSENSUS, you can develop applications in COBOL and in CGL procedural and non-procedural languages. CONSENSUS accesses almost every popular database and lets you develop in CICS, CMS, VMP/C or batch environments. And, most importantly, all CONSENSUS components are compatible with one another and with existing applications.

CONSENSUS is truly a breakthrough product. One which can change the way you develop CICS applications.

So if you thought you'd never find an applications development tool that's as versatile as you are, you're in for a nice surprise.

It's ready now.

Call 1-800-237-8771 today!

Martin Marietta Data Systems
CONSENSUS Information
PO Box 2392, Princeton, NJ 08540

- I'd like a representative to call.
- Please send me literature.
- Send me info on your other products.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone () _____

MARTIN MARIETTA

DATA SYSTEMS

**Martin Marietta's CONSENSUS.
We're ready now.**

NEW PRODUCTS

ADR updates PC/Datacom report facility

Applied Data Research, Inc. (ADR) of Princeton, N.J., has announced Release 2 of ADR/PC Datacom, a personal computer-based query and report-writing facility.

PC Datacom is said to support the exchange of data between the IBM Personal Computer and the mainframe, as well as other personal computer functions.

Release 2 features personal computer-based query creation and host data download and upload, a full function report writer, data export and import for the exchange of data between personal computer spreadsheet and other applications software and a procedure facility for unattended and repetitive tasks.

The enhanced download function of PC Datacom is menu driven. The download function permits users to transfer personal computer-created information to a mainframe ADR/Datacom/DB data base where it can be retrieved by other PC Datacom or mainframe ADR/Dataquery and ideal users. It can also be used as a transaction file for updating production data.

The report writer supports sorting, column totals, control breaks, special selection criteria, key word, user-defined arithmetic calculations. The data export function reformats downloaded data into formats including Comma Separated Value and Data Interchange Format.

All of PC Datacom's interaction with ADR/Datacom/DB on the mainframe is performed under the control of ADR/Data-dictionary and ADR/Dataquery. Data access can be controlled by table, field or field content value.

PC Datacom is shipped with ADR's PC Link communications software. It operates on any IBM Personal Computer, Personal Computer XT or AT using IBM PC-DOS 2 or higher.

The IBM 3270 Personal Computer is also supported.

PC Datacom requires ADR's mainframe Datacom/DB, Datadictionary and Dataquery.

PC Datacom costs \$496 per copy.

Harris configurations debut

Design to manufacturing on one integrated system

Harris Corp. of Fort Lauderdale, Fla., has introduced three configurations of Harriscad, a fully integrated system for computer-aided design, drafting, engineering and manufacturing.

The configurations are said to enable users to go from design concept, analysis and drafting to manufacturing on one integrated system.

According to the vendor, each system includes the Harriscad design and drafting software, a compact Harris superminicomputer designed for the engineering office and peripherals.

The entry-level configuration, priced at \$90,000, supports two users. It includes a Harris 60 computer with 1.5M bytes of memory, integrated floating-point processing, a 474M-byte disk drive and a streaming tape drive.

The medium configuration, priced at

\$110,000, supports four or more users. It includes a Harris 60 computer with 3M bytes of memory, integrated floating-point processor, a 474M-byte disk drive and a streaming tape drive, according to the vendor.

The largest configuration, priced at \$127,000, also supports four or more users. It includes a Harris 60 computer with 6M bytes of memory, integrated floating-point processor, 6M bytes of cache memory, a 474M-byte disk drive and a streaming tape drive.

Hardware options, such as additional memory and user terminals as well as software options, including numerical control and analysis, are available, the company said.

The Harriscad module for numerical control costs \$10,000.

Metaphor Reporter uses icon interface to retrieve data

Metaphor Computer Systems, Inc. of Mountain View, Calif., has announced Reporter, a reporting tool that allows users to access data through an icon interface from the company's Metaphor information retrieval system.

Reporter allows users to retrieve and analyze information and to produce custom-tailored reports. It works with Metaphor, a special computer system that presents a customized view of mainframe data. The system operates in conjunction with IBM VM and MVS hosts.

Reporter is available now and can be added to existing Metaphor installations for \$300 per workstation. The new price of the Query Tool Set, including Query and Reporter, is \$1,000. A complete Metaphor Workstation Tool Set, including Reporter, Query, Applications Capsule, Basic, Spreadsheet, Plot and Text, costs \$1,500.

Cosmic expert systems tool out

Cosmic, the National Aeronautics and Space Administration's Computer Software Management and Information Center of Athens, Ga., has announced the availability of Cerberus, a forward-chaining knowledge-based system that is said to allow users to experiment with expert systems.

Reportedly, Cerberus can be used to develop and test expert systems such as a financial advisor or a decision analysis program. It also can be used as a teaching tool because it can trace and recount the rules used to reach a given conclusion.

Cerberus received Cerberus for distribution in December. Fortran 77 source code is available for \$1,750, which, the vendor said, is basically its reproduction cost. It was written on a Digital Equipment Corp. VAX computer running VMS and will run on any VAX. Because the program is written in Fortran, it reportedly does not require any special hardware.

Wish You Could Increase The Productivity Of Your CICS Users? And Improve CPU Utilization? You Can If You Have SYSD!!

SYSD offers these powerful capabilities:

- ISPF - Like Editor
 - * Full Dataset Browser
 - * PDS and Sequential File Access
 - * Parameter® Interface Option
 - * Job Submission
- On Line Report Viewing
 - * Direct JES Interface
 - * Line Overhead
- Control and Direct Printing of Batch Reports to CICS Printers
- JES Queue Status Displays
- System Programmer Aids
- Full Security
- VS1, MVS, MVS/XA

Look At Why Over 450 Users Like SYSD:

D.P. Operations Managers prefer SYSD because it gives them the ability to do all their alternative data processing functions in either user or common. It gives them better and greater throughput, quicker turnaround, and a reduction in CPU utilization.

Technical Services Managers trust SYSD because it makes the right tools in the user's toolbox off-load and better control TSO usage.

Application Development Managers insist on SYSD because it makes their programming staff more productive. They can easily compile and test programs without ever touching on CICS.

D.P. Managers on VMS like SYSD because it gives CPU resources, plus adds better service, and allows them to get more out of their existing hardware investment.

Convince Yourself Take
Advantage Of Our 30-Day Free Trial.
Call Us Now At (208) 377-0336
Or Write To Us At:



H&W COMPUTER SYSTEMS INTERNATIONAL
PO BOX 4765
Boise, Idaho 83711-4765

SYSD™ is a registered trademark of Paragon Systems, Inc.

NEW PRODUCTS/SOFTWARE & SERVICES

SOFTWARE & SERVICES

Systems software

Interactive Solutions Corp. has released Version 2.1 of its *Keygraf/3000*, a business graphics system for the Hewlett-Packard Co. HP 3000.

Keygraf is said to integrate graphics with analysis and data modeling functions. Version 2.1 allows *Keygraf* charts to be incorporated into other software packages that use figure files. It also provides a direct interface to remote plotters connected to the HP 3000.

Version 2.1 costs \$995 with limited support or \$2,995 with extended support. Existing users may upgrade for \$325.

Interactive Solutions, P.O. Box 554, Woodinville, Wash. 98072.

Softworks, Inc. has announced VSAM Mechanic, a program said to provide VSAM installations with facilities for repairing damaged VSAM/ICF catalogs and VSAM data sets.

VSAM Mechanic allows users to recover lost VSAM catalogs and data sets as well as repair damaged ones without down-leveling data. The vendor said that it means increased system availability to meet batch production schedules.

VSAM Mechanic operates with all OS/MVS systems. A site license costs \$9,950.

Softworks, 7700 Old Branch Ave., Clinton, Md. 20735.

Sinware, Inc. has announced *SinScope*, a software package for IBM mainframes running the VM/SP operating system.

SinScope is said to be able to trace data flows on devices connected to a VM/SP system. It can trace I/O activity on telecommunication lines, disk tracks, tape drives, 3270 terminals, control units and channels.

SinScope is available for an annual lease price of \$3,500 for a single CPU or \$10,000 for a site license.

Sinware, 14 Concourse Gate, Nepean, Ont., Canada K2E 7S6.

Data Translation, Inc. has announced MicroVMSLIB, a software package for Digital Equipment Corp.'s Microvax II said to allow high-speed data acquisition and control functions.

Features include continuous data transfer to disk at throughput rates of 100,000 samples/sec., on-line Help, automatic verification and support of three modes of

data collection.

The initial license for MicroVMSLIB is \$1,995.

Bell & Howell Manufacturing Systems and Services has introduced Power+, a software package designed to enhance IBM Communications-Oriented Production Information and Control Sys-

tem operations.

Power+ is said to generate management reports and analyses necessary for manufacturing resource planning, and cost control. There are two parts of Power+, the Standard Cost Accounting System and the Job Cost Accounting System.

The basic cost of Power+ is \$29,000. Supplemental packages cost from \$1,500 to \$9,000.

Bell & Howell, 2231 Howard St., Evanston, Ill. 60202.

Global Software, Inc. has added modeling capabilities to its Hospital Cost Control System (HCCS), a cost accounting package for health care institutions.

Modeling techniques are said to allow administrators to project the effects of scenarios on treatment patterns and procedure volumes.

HCCS runs on IBM 4300, 3000 and plug compatible plus System/34, 36 and 38.

A basic system costs about \$250,000 operating in a DOS

mainframe environment.

Global Software, 1009 Spring Forest Road, Raleigh, N.C. 27609.

On-Line Software International, Inc. has released Verify Version 2, an enhancement of its CICS testing control system.

Verify is said to automate regression testing for CICS applications by logging data transmissions and simulating

TODAY IS THE IN DOT MATRIX

It would pay you to mark it on your calendar:

Because today is the day we introduce our new Pinwriter™ PSXL dot matrix printer. The only dot matrix printer available capable of producing the crisp, black printing you associate with a letter-quality printer. Because it's the only one designed to use not just a fabric ribbon, but a letter-quality multistrike film ribbon—the same ribbon used in typewriters and letter-quality printers.

It's only natural that the first dot matrix printer with true letter-quality printing should be an NEC. After all we make Spinwriter™ letter-quality printers, the most popular line today, as well as the Pinwriter PS series dot matrix printers, the most advanced and extensive family of 24-pin printers available.

Black letter-quality printing is not the only thing our Pinwriter PSXL can do. It can also use an optional ribbon to print seven other colors. And it has the finest graphics resolution of any impact printer available. So charts and drawings are much more vivid. Plus it's very fast, extremely quiet and can use an array of type faces. And it's designed and built to have the reliability that has made NEC printers legendary.

CeC

**A LITTLE
BLACK MAGIC.**

Actual line printed with
the Pinwriter PSXL printer.

© 1986 NEC Corp.

EDUCATORS EXCELLENCE

both its design and the resulting
ease of use were two of the
factors I won the International
Design Award in both 1988
and 1994.

EDUCATORS EXCELLENCE is a trademark registered for a
series of computer software products by DECA.
DECA is a registered trademark of DECA Systems
Corporation, Inc., a division of DECA Systems, Inc.



So it only makes sense that our video terminals are substantially more compatible up and down the Digital family line. Each new generation, for example, brings with it all the important elements from previous generations. Which is why you'll find some of our customers using 10 year-old VT52™ terminals with brand new VAX systems. The simple fact is, Digital has always been committed to protecting your investment with every move you make.

In addition, our breadth of product line means Digital can provide you with a total solution. Hardware, software and peripherals. And while single sourcing is not an end in itself, it certainly provides an extraordinarily measured convenience, compatibility and reliability. Particularly when the single source is Digital.

THE DIGITAL LOGO MEANS LONG TERM RELIABILITY AND SUPPORT.

When asked to single out the strongest feature of Digital's video terminals, many users point to the most visible asset of all. Durability.

Over the years, we've heard some pretty gruesome stories about the ordeal our terminals have endured. Like coffee that was spilled on keyboards. Or cables that were inadvertently ripped from their ports. They've even survived trial by fire. While it's unreasonable to expect even the toughest video display to come through every major trauma unscathed, it's comforting to know your terminal has a reputation for survival.

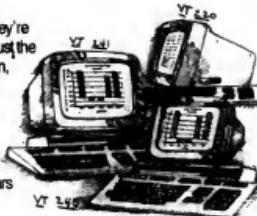
It's equally comforting to know you've got a support team behind you every step of the way. A support team rated the best in

the business by users.* They're there for everything. Not just the repairs, but system design, training, updates, education and seminars. All to make sure you get the absolute maximum from your video terminals. Today, tomorrow, and years down the road.

BEST ENGINEERED MEANS ENGINEERED TO A PLAN.

The VT220,™ VT240,™ and VT241,™ like every Digital hardware and software product, are engineered to conform to an overall computing strategy. This means our products are engineered to work together easily and expand economically. Only Digital provides you with a single, integrated computing strategy - from desktop to data center.

For a detailed brochure or



more information, as well as the name of the Authorized Terminal Distributor or Digital Representative near you, write Digital Equipment Corporation, 129 Parker Street, Maynard, MA 01754.

THE BEST ENGINEERED COMPUTERS IN THE WORLD.

digital™

1 7 2



NEW PRODUCTS/SOFTWARE & SERVICES

Continued from page 69
 of machine language instructions with fewer, more powerful vector instructions. According to the vendor, Vector C analyzes programs for opportunities to apply vector instructions.

Vector C is priced at \$20,000.
 Convex Computer, 701 N. Plano Road, Richardson, Texas 75081.

Utilities

Alidon Computer Group has ported its S/Compare source comparison utility to the IBM System/38.

S/Compare is said to find differences between two source files and display them on a report.

S/Compare costs \$2,100. After 120 days there is a yearly maintenance fee of \$300.

Alidon Computer Group, 405 14th St., Oakland, Calif. 94612.

Sterling Software Marketing Co. has released its Comparex Version 6 comparison utility.

Comparex 6 is said to provide the ability to compare the contents of any two files of similar or differing formats and structures.

Comparex costs \$9,500 for MVS versions and \$5,000 for DOS/VSE and VM/CMS versions.

Sterling Software Marketing, Suite 100, 11050 White Rock Road, Rancho Cordova, Calif. 95670.

Panasonic Systems, Inc. has released Gener/OL 5, an enhanced version of its interactive on-line program development and query system designed for use under CICS.

The base system consists of a number of editor/compilers.

Gener/OL costs \$49,000 for OS and \$35,000 for DOS versions.

Panasonic Systems, 709 Enterprise Drive, Oak Brook, Ill. 60521.

Vols Associates, Inc. has announced T-Equate, a magnetic tape-based file management system for the Hewlett-Packard Co. HP3000, and Harmony, an HP3000 system management support service.

T-Equate provides a set of functions said to automate aspects of the management of magnetic tape residual files and file sets.

The Harmony service provides periodic system performance reviews, cost/benefit analysis of software and hardware installation plans, applications design, applications performance and configuration analysis.

T-Equate costs \$3,500. Harmony is priced from \$1,500.

Vols Associates, 34 Undine Ave., Wimthrop, Mass. 02152.

Jyace, Inc. has announced Version 2 of its Jyace Formaker screen and window manager.

Jyace Formaker consists of a utility for creating and maintaining forms and windows and a subroutine library providing access to them. Version 2 enhancements include: Help windows on a field or form basis, automatic creation of C structures for saving the contents of the forms, optional graphic borders, multiple range checks, date and time format-

ting, data calculations and check-digit calculations.

Jyace Formaker runs under Unix, Prime Computer, Inc. Primos and Microsoft Corp. MS-DOS and Xenix operating systems.

Prices range from \$650 to \$3,000. Jyace, 919 Third Ave., New York, N.Y. 10022.

Oasys, a division of XEL, Inc. has announced the Oasys 65020 Toolkit, a set of Motorola, Inc. MC68020 software development tools.

The tool kit features a line of compilers, assemblers, debuggers, simulators, profilers, real-time OS and download load utilities. Support for the Motorola 68881 floating-point processor is also provided.

The tool kit is available on Digital

Equipment Corp. VAX and Microvax systems and Sun Microsystems, Inc., Apollo Computer, Inc. and other systems running Unix.

A typical configuration starts at \$3,200.

Oasys, 60 Aberdeen Ave., Cambridge, Mass. 02138.

Wild Hare Computer Systems, Inc. has released an enhanced version of its Choice software.

Choice reportedly runs programs written in Data General Corp.'s interactive Cobol language on non-DG computers.

No conversions, translations or recompilations are required, according to the vendor.

Compatibility is maintained because the same program and data

files from the DG computers are used on the target machines.

Prices range from \$499.95 for Microsoft Corp. MS-DOS software to \$9,725 for Digital Equipment Corp. VAX systems.

Wild Hare Computer Systems, P.O. Box 3581, Boulder, Colo. 80307.

Training software

Sterling Software Marketing Co.'s Dylanor Division has announced CBT Level 2, The Intermediate Guide, a software program designed to instruct users of its DYL-280 and DYL-280 II information management systems.

CBT Level 2 is intended for moderately experienced users. Points covered include using control breaks and summary processing, key informa-

Continued on page 74

BUY YOUR MULTI-USER "SUPERBOX" BY MAY 31,

AND I FEAR SERVICE ARE FREE!

No matter what superbox you're considering, we believe our Universe systems run faster, support more users, and COST LESS. To be up-to-date, we're extending an exceptional offer.

You buy one of our special "Superbox" configurations: A 16MHz 68000-powered Universe 2400, a VERSA-bus-based, 68020-powered Universe 32. With either you get a 12.5MHz 68000 I/O processor, 4MB of memory, 45MB disk (internal), 45MB streaming tape, and 12 serial ports. You pay \$29,900.

With each Superbox you also get a FREE UNIX System V Configuration Software (disk included), a VERSA System V license, a VERSA bus license, a 12.5MHz 68020 processor, a 12.5MHz 68000 I/O processor, a 12.5MHz 68000 memory board, a 12.5MHz 68000 disk controller, 45MB streaming tape, and 12 serial ports. That's \$13,400 worth of FREE.

Orders must be placed by May 31, 1986, for delivery by June 30, 1986. After

To Charles River Data Systems, 983 Concord St., Falmouth, MA 02701
 Detailed specifications on the "Superbox" VME configuration
 VERSAbus configuration VERSAbus disk and tape drives
 VERSAbus memory VERSAbus I/O boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers VERSAbus tape controllers
 VERSAbus memory boards VERSAbus disk controllers
 VERSAbus tape controllers VERSAbus memory boards
 VERSAbus disk controllers <

NEW PRODUCTS/SOFTWARE & SERVICES

Continued from page 73

tion processing, sorting variations, multiple report combinations and formating and printing variations.

The program runs on Microsoft Corp. MS-DOS or IBM PC-DOS computers with IBM Personal Computer-compatible color or monochrome graphics boards. It costs \$1,000, or \$800 for owners of CBT Level 1.

Dylakor, P.O. Box 3010, 17418 Chatsworth St., Granda Hills, Calif. 91344.

Services

Associated Technology Corp. has introduced a four-volume programming documentation guide for Cobol, Fortran, Basic and DBase languages.

The set was designed to serve as a software reference tool for establishing a firm's internal programming and documentation practices.

The set costs \$47.50.

Associated Technology Books, Box 475, Rt. 2, Estill Springs, Tenn. 37330.

Dataline Corp. has introduced a computer security personal client retainer service designed to meet the needs of small business people and individual managers.

The offering provides ongoing services including an educational protection package, security awareness material, customized risk evaluations, 24-hour hot line access to seminars and products, individual consultation and confidentiality in all aspects.

There is a \$40 yearly retainer fee for the service. Optional services, such as group training, staff evaluation and microcomputer assistance, are available for an added charge.

Dataline, P.O. Box 16221, Minneapolis, Minn. 55415.

Patricia Seybold's Office Computing Group has announced **Patty Seybold's Network Monitor**, a research service covering local-area networks.

The service comprises a monthly newsletter and two market research reports. The vendor said each month the "Network Monitor" will present analyses of products

and strategies designed to enable users to make better informed buying decisions.

The program is available for \$495 per year. The full service costs \$1,895.

Office Computing Group,

Suite 512, 148 State St., Bos-

ton, Mass. 02109.

■

Multipath, Inc. is offering a catalog listing library of public domain Microsoft Corp. MS-DOS, IBM PC-DOS,

Digital Research, Inc. CP/M 80 and CP/M 86 software on 3½-, 5¼- and 8-in. floppy disks.

Categories include Unix utilities, programmers' tools, word processors, data base managers, telecommunications programs and terminal emulators. Packages listed include accounting pro-

grams.

All software is updated

from nationwide bulletin boards.

The catalog describes each

program and lists public domain software bulletin boards. It costs \$5.

Multipath, P.O. Box 366,

Montville, N.J. 07045.

MICROS

Systems

Compaq has intro-

duced the Connection 32

a workstation able to run Mi-

crosoft Corp. Xenix and MS-

DOS concurrently.

The Connection comes in both 16- and 32-bit configura-

tions. The Connection 32 includes 1.64M bytes of random-access memory (RAM), a 20M-byte Winchester disk drive, a 360K-byte floppy drive and 16M bytes of virtual RAM. The Connection 16 includes two floppy drives and 640K bytes of RAM.

The price range is from \$2,995 to \$4,995.

Compaq, Suite 306, 1460 4th St., Santa Monica, Calif. 90401.

IBM ASCII terminals:

The case in black and white.

Introducing a somewhat more colorful member of the family.

Meet the IBM 3164 ASCII Color Display Station.

It gives you eight foreground and eight background colors. On a 14" screen.

And because of its 8 x 16 character matrix, the 3164 gives you clear, crisp characters in color.

But is color any reason to buy IBM's 3164? It is, according to studies that indicate the use of color increases productivity, decreases errors and promotes user satisfaction.

Color, of course, is far from the sole reason for choosing the 3164. To appreciate the others, you should get to know the rest of our ASCII family.

Emulation. Another side of the family.

Our ASCII terminals are designed to fit into existing systems. Even if the systems aren't ours.

Emulation Capability	
3161	IBM 3101 Model 881 ADOS Viewpoint® Hercules 150® Low-End ADM-3A® Low-End ADM-5® TeleVideo 900®
3163	IBM 3101 Model 881 DEC VT 22® DEC VT 42® TeleVideo 910®
3164	IBM 3101 Model 881

For example, our basic ASCII Display Station, the IBM 3161, emulates up to six

Features	3161	3163	3164
Screen size	12"	12"	14"
Lines x characters	25x80	25x80	25x80
Character matrix	8x16	8x16	8x16
Double-sized characters	No	Yes	Yes
Line drawing characters	24	24	24
Vertical scroll	Jump	Jump/ Smooth	Jump/ Smooth
Definable function keys	24	24	24
Windowing	No	Yes	Yes
Partitioning	Horis.	Vert./ Horis.	Vert./ Horis.
Characters in buffer	1920	7680	7680

terminals. And the advanced-function 3163 emulates a number of higher level ASCII data streams.

What's more, every one of our ASCII terminals can operate in its own function-rich native mode.

Our family is flexible.

Our unique plug-in cartridges allow for considerable flexibility in your operation. For example, simply by switching cartridges you can shift a terminal from one data stream to another.

And, in many countries cartridges are also available that go beyond emulation to let you operate your ASCII terminals in several foreign languages. Appropriate foreign language keyboards are also offered.

Enhanced ergonomics. Another family trait.

All our ASCII terminal keyboards have 102 keys. But that's not all they have in common. Every keyboard also has a low profile, gentle contour and typewriter touch.

And our keyboards have

programmable function and editing keys so they can be custom-tailored to fit your application needs. The 3163 and 3164 models also have redefinable and recappable keys.

Superior ergonomic design isn't confined to the keyboard, however. All three displays tilt and swivel for maximum user satisfaction. And, of course, by making the display easy to read, we made it easier on the eyes. In addition to the 8 x 16 character matrix, we gave it an advanced non-glare etched screen, cursors, and character and field attributes like blink, reverse video, under-scoring and dual intensity.

High standards. Competitive prices.

Quantity discounts are offered, too. And financing is available through the IBM Credit Corporation. Best of all, each terminal comes with the quality, service and support you'd expect from IBM.

Contact your IBM marketing representative, or call 1-800-246-2468, Ext. KC/90, for the IBM Authorized Distributor nearest you. And we'll present more evidence in the case for IBM's ASCII terminals.

It may be all you need to color your view.

ADOS Viewpoint is a trademark of Applied Digital Data Systems, Inc.; Hercules 150 is a trademark of Hercules Computer Technologies, Inc.; Low-End ADM-3A is a trademark of Advanced Micro Devices, Inc.; Low-End ADM-5 is a trademark of Advanced Micro Devices, Inc.; TeleVideo 900 is a trademark of TeleVideo Systems, Inc.; DEC VT 22 is a trademark of Digital Equipment Corporation.



NEW PRODUCTS/MICROCOMPUTERS

Sintec Co. has announced an IBM Personal Computer XT-compatible computer.

Features include 256K bytes of random-access memory, eight full expansion slots, 135W power supply, floppy disk controller board accommodating up to four drives, full-function keyboard, 360K-byte floppy disk drive, monochrome monitor and a monochrome graphics card with printer port.

The complete system costs \$995.

Sintec, Box 410, 28 Eighth St., Frenchtown, N.J. 08825.

Software applications packages

G. O. Graphics has introduced **Deskset**, desktop publishing software for users of Apple Computer, Inc. Laserwriter and IBM Personal Computers.

Deskset provides inter-character fit, automatic white space reduction in larger type sizes, accurate

hyphenation with industry-specific exception word dictionaries and full size and style mixing. Other features include interactive input showing line-ending justification, batch input and justification from other ASCII word processing files and multiple font setting.

Deskset software costs \$995. A system including Deskset, IBM Personal Computer and Apple Laserwriter costs \$9,495.

G. O. Graphics, 18 Ray

Ave., Burlington, Mass. 01803.

Cricket Software has announced **Cricket Graph**, a color presentation graphics and page layout package for the Apple Computer, Inc. Macintosh.

Cricket Graph offers scatter, line, area, bar, column, pie, stacked bar, stacked column, polar, quality control, double-Y and text graph and

chart types. It allows for plotting of more than 2,000 point/series. Data can be entered in rows and columns or imported from text-only files or from other application programs.

The program offers data manipulation and multiple graph page layout. Cricket Graph costs \$195. Versions for film recorders and color printers cost \$495.

Cricket Software, Suite 206, 3508 Market St., Philadelphia, Pa. 19104.

Pyramid Data, Ltd. has introduced **Paragon — Client Accounting**, software said to provide client accounting capabilities as well as accounts payable, accounts receivable, payroll and inventory functions.

Client Accounting is designed in conjunction with the vendor's Paragon — Accounting for Everyone. It operates on the IBM Personal Computer, Personal Computer XT or AT and requires 256K bytes of memory and a 10M-byte hard disk. Features include an after-the-fact payroll entry screen, custom financial statements and an unlimited number of accounts.

Paragon — Client Accounting costs \$49.95. Paragon — Accounting for Everyone costs \$995.

Pyramid Data, P.O. Box 10116, Santa Ana, Calif. 92711.

Indian Ridge Enterprises, Inc. has added a set of general accounting applications to its line of application packages for IBM microcomputers.

The applications include general ledger, accounts receivable, accounts payable, payroll, inventory and order entry. The packages are fully integrated but can also run stand-alone. They provide auditing records, documenting all transactions plus reporting options.

The packages cost \$29.95 each.

Indian Ridge Enterprises, 508 2nd St., Oakland, Calif. 94607.

IBM/38-36 BACKLOG REDUCTION

The world's most successful companies have made Fusion Products Int'l. the leading supplier of query/report-processor and spreadsheet software for the IBM/38-36, Coll 415 461-4760 or write:

Fusion Products International
900 Larkspur Ln. • Suite 293
Larkspur, CA 94938 • Telex 176099

FUSION

The case in color.



IBM

**We just lost Pittsburgh!
Where's the datacomm
manager?**



Don't jump.

Network management.

With it, you're on top of the world.

Without it, you're a goner.

Hold on.



We're Infotron. We design, build and install communications networks. Reliable. Compatible. Sophisticated networks that offer single-point control and real-time monitoring.

Our ANM Advanced Network Manager, coupled with a 990/992NP Network Processor, can pinpoint real or potential trouble spots, plus eliminate costly downtime by automatically rerouting data.

Control yourself.
Take the first step: Call
1-800-345-4636.



INFOTRON SYSTEMS

See us at Interface '86. Booth #1428.

NEW PRODUCTS/MICROCOMPUTERS

Software languages

Byte Corp. has announced **Generic**, an applications generator for Ashton-Tate's **Dbase III** relational data base management system.

Genifer allows programmers to create business applications in the **Dbase III** language. It allows developers to create screens, menus and reports interactively. Features include a data dictionary, a screen editor and a report-generation facility.

Genifer costs \$495.

Byte, 1029 Solarano Ave., Berkeley, Calif. 94706.

Database Software Systems Ltd. has introduced **Transactional Systems Manager** (TSM), an applications generator designed for use on an IBM Personal Computer with IBM PC-XTs or Microsoft Corp. MS-DOS 2 or higher.

TSM consists of a runtime module, a tool kit for configuration, setting terminal codes, file markers, passwords, a word processor with box-drawing abilities and a design editor.

TSM uses windowing, Help and special editors so that applications are defined, not designed. No code is ever created, the vendor said.

TSM costs \$495.

Dynamic Software Systems, 51 Tannery St., Mississauga, Ont., Canada L5M 1V3.

Production Systems Technologies, Inc. has announced that OPS83, the expert systems programming language, is now available for use on the IBM Personal Computer and compatibles.

The personal computer version, designed for developing and delivering practical systems, is said to be identical to the original version. It is written in C and the small code size gives users access to more memory. It also interfaces with other languages.

OPS83 costs \$1,850 for each personal computer license.

Production Systems Technologies, 642 Gettysburg St., Pittsburgh, Pa. 15206.

Software utilities

System Automation Software, Inc. has announced **Release 2** of its **Logger** computer resource monitor.

Logger is a random-access memory resident program that tracks and documents the use of IBM Personal Computers, Apple II computers and Macintoshes. Release 2 offers login security and a summary option in the reporting subsystem that summarizes computer usage by user, directory and program.

Logger is priced at \$74.95. Owners of **Logger 1** can upgrade for \$20.

System Automation Software, 8555 Sixteenth St., Silver Spring, Md. 20910.

Computerfile, Inc. has introduced **Laserfile**, a memory-resident software interface for the Hewlett-Packard Co. LaserJet printer and the IBM Personal Computer.

Laserfile is said to enable users to access all the features of the LaserJet printer without interfering with the features of the software application program in use. It supports Xon/Xoff

and RTS/DTR protocol and can be used with any parallel or serial port. It offers IBM Displaywrite 3 support and a printer spooler called **Jetspool**. **Laserfile** costs \$149. With **Displaywrite 3** support it costs \$199. **Jetspool** costs \$19.95.

Computerfile, Suite 1008, 1201 Broadway, New York, N.Y. 10001.

and art or any art from Clip Art Collection Volume I. It runs on the IBM Personal Computer, Apple Computer, Inc. Apple II and Commodore Business Machines, Inc. computers. It is priced at \$39.95.

Springboard Software, 7808 Creekridge Circle, Minneapolis, Minn. 55435.

Springboard Software, Inc. has announced **Clip Art Collection Volume 2**, a collection of business illustrations for use with its software program, **The Newsroom**.

The collection features a library of over 800 illustrations designed for over 800 illustrations designed for use in business and office-oriented publications with **The Newsroom**.

The program can be used in conjunction with **The Newsroom's** origi-

nal art or any art from Clip Art Collection Volume I. It runs on the IBM Personal Computer, Apple Computer, Inc. Apple II and Commodore Business Machines, Inc. computers. It is priced at \$39.95.

Springboard Software, 7808 Creekridge Circle, Minneapolis, Minn. 55435.

Indigo Software Ltd. has unveiled **Iprint**, a forms and graphics generation program for laser printers.

Iprint is said to allow the use of an IBM Personal Computer to draw forms and graphics interactively on the screen using a mouse or a cursor and function keys and to save the results as an electronic form.

Iprint supports printers from

Hewlett-Packard Co., Canon, Inc.,

IBM and NCR Corp. It costs \$259. **Indigo Software**, 1568 Carling Ave., Ottawa, Ont., Canada K1Z 7M5.

Guaranteed Software has announced **Arkive**, a storage management system for hard disk personal computer users.

Arkive is a memory-resident automated file tracking and archival program. Files can be located based upon criteria such as subject matter, creation program or date. It offers a clean-up mode that identifies files that are obsolete or not needed. **Arkive** also supports file versions.

The **Arkive** package costs \$79.95 plus \$5 for shipping.

Guaranteed Software, 10044 South DeAnza Blvd., Cupertino, Calif. 95014.

"Where can I find controllers that access multiple 3270 and Async hosts, terminals that window multiple 3270 Async sessions, a PC network server that won't commit me to a single LAN, and . . ."

Get the new Lee Data Passport. And new sol

As you search for new solutions, the new Lee Data Passport could be the best traveling companion you've ever had.

In it, you'll find a new generation of Lee Data Network and local processing solutions for 3270, Async, and PC environments.

Solutions that get information across corporate, workgroup, and personal computing borders so smoothly, your entire network can finally function as a single system.

Just as important, each solution is designed to help you keep your costs in line.

For example, one Lee Data controller can support multiple Async hosts, plus up to four on-line 3270 hosts. Local or remote. In any combination.

The Lee Data One™ "display" can replace four ordinary 3270 and Async host sessions. Without a PC.

Lee Data's new LANMASTER™ PC network server allows multiple LANs to share files and peripherals,

NEW PRODUCTS/MICROCOMPUTERS

The Perpetr Division of Escalex Corp. has announced the Xenis driver software package for its DCP-88 intelligent communications board designed for IBM Personal Computer AT-based multuser systems.

It is said to be fully compatible with Microsoft Corp.'s Xenix System 5. Along with an Intel Corp. 8088-based, multiplex DCP-88 communications card, it can support four industry-standard asynchronous terminals at 9.6K bps/sec.

The Xenix driver costs \$150.

Escalex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

Software enhancements

Softcraft, Inc. has released Strive 4 and Strive/N 4, enhanced versions of its file management software for the IBM Personal Computer.

Personal Computer AT and compatibles.

Features include variable-length records, data encryption, password protection and a file-level verify option. Strive/N 4, for multuser and local-area network systems, is now available for any local net that supports the Microsoft Corp. MS-DOS 3.1 file-sharing function.

Strive 4 and Strive/N 4 cost \$245 and \$595, respectively.

Softcraft, P.O. Box 9802, #917, Austin, Texas 78766.

Communications

Computer Mail Services, Inc. has announced Mailplus, a software product said to allow MCI Communications Corp. MCI Mail subscribers to enter and exit the system with only two keystrokes.

Mailplus is said to provide built-in security to prevent unauthorized use of an MCI Mail account. It also enables MCI Mail customers to personalize form letters and verify ZIP codes. It remains on-line as long as required.

Mailplus requires an IBM Personal Computer with 256K bytes of memory, a communications port and a modem. It costs \$95.

Computer Mail Services, 17200 W. Ten Mile Road, Southfield, Mich. 48075.

Graftel, Inc. has introduced the VP 220 Buffered Multiplexer, said to enable up to four personal computers or terminals to share one or two printers or plotters.

The unit automatically stores

print requests in its buffer memory and schedules printing output dynamically without operator intervention. Multiple units can be linked together to serve up to 16 users.

The VP 220 Buffered Multiplexer costs \$1,595 for a 256K-byte version and \$1,995 for a 512K-byte version.

Graftel, 400 Executive Blvd., Elmsford, N.Y. 10523.

Quadrax Corp. has launched its Mainlink line of micro-to-mainframe communications products.

The line is made up of four half-card-size expansion cards said to permit IBM Personal Computer, Personal Computer XT's or AT's to emulate IBM 3278 and 3279 terminals.

The Mainlink Standard coaxial connection and the Mainlink Plus coaxial connection link directly to an IBM 3274 or 3276 cluster controller. The remote versions attach via synchronous modem to an IBM 3705 or 3725 in IBM's Systems Network Architecture/Synchronous Data Link Control mode.

For the Mainlink Standard coaxial, the Mainlink Standard coaxial, the Mainlink Standard remote and the Mainlink Plus remote are \$895, \$1,145, \$1,545 and \$1,895, respectively.

Quadrax, One Mecca Way, Norcross, Ga. 30093.

Dialog Information Services, Inc. has announced Dialoglink, a software service designed to enhance the use of the vendor's Dialog Knowledge Index and Dialmail on-line services.

Dialoglink consists of two modules: the Communications Manager, offering one-step logon to each on-line service, and the Account Manager, providing accounting information, including user-supplied charge codes for sessions with the Dialog services.

Dialoglink operates on IBM Personal Computers, Personal Computer XT's, AT's and compatibles. The pack-

Continued on page A2

9-TRACK TAPE DRIVE

Tired of Waiting for the Network?



The solution to your PC to mainframe communications problem is available TODAY!

QMS's new MINISTREAMER brings full 9-Track 1600/3200 CPM interchange capability to the desktop at an affordable price. Available in both 7" and 10½" versions, the MINISTREAMER is an ideal alternative to expensive network systems.

If mainframe data interchange is a problem for you, please call us today!

QMSLASTER CORPORATION
9015 Elton Avenue
Canoga Park, CA 91304
(818) 882-5812

Solutions for your growing information network.

while simultaneously sharing communications gateways to multiple 3270 SNA and Async hosts.

And the Lee Data Associate Processor gives departmental terminal users access to department-specific applications, plus spreadsheets and word processing applications normally available only to PC users.

So, before you start traveling in the wrong direction, get the new Lee Data Passport. And new solutions for your growing information network.

See Us At Booth 1150 At Interface '86

LEE DATA
CORPORATION

©1986 Lee Data Corporation



Tough Tech means UNIX O/S some

Somebody had to do it.

After all, the whole idea behind a standard operating system is to get the most out of your expensive software applications.

And a UNIX™ Operating System can do that.

The problem has been in *using* it. An experience called everything from "tedious" to "difficult". (And that's being kind).

But now all that's changed.

We've tamed UNIX Operating Systems.

We took 250 UNIX O/S commands. And created the UNIX O/S Menu Shell.

Want to edit? Point to the word on the Menu screen.

And push a key. That's all you do to execute any of the 200 most common UNIX O/S commands.

Want to sort? Point to the word. And push a key. That's all you do to execute any of the 50 most complex UNIX O/S sequences.

Not sure of your next move? Push a key and the HELP feature displays clear, concise instructions. Right there on the screen.

Before you know it, you're actually doing meaningful things with UNIX O/S. Including protecting your software investment. By maximizing its portability.

Only Sperry offers this menu-driven approach. On the industry's widest range of products, running UNIX O/S.

somebody finally taught manners. 250 of them.

So the question isn't *whether* or *not* to go with UNIX O/S.
But who to get it *from*.

For further information, telephone toll-free
1-800-547-8362, and ask for Information Kit #90. Or
write Sperry Corporation, Dept. 100, Box 500, Blue
Bell, PA 19424-0024.

UNIX is a trademark of AT&T Bell Laboratories. ©Sperry Corporation, 1986



**Tough Tech.
The power to get things done.**

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 78

age costs \$125. The Communications Manager alone costs \$95, and the Account Manager alone costs \$45.

Dialog, 3460 Hillview Ave., Palo Alto, Calif. 94304

Data storage

Hewlett-Packard Co. has announced a 3½-in., 20M-byte Winchester internal hard-disk subsystem. The HP Vectra personal computer as well as a price reduction for the 40M-byte hard-disk subsystem and an updating of data storage components.

The drive mechanisms, ST506 controllers, mounting brackets and cables can now be purchased as separate products, company spokesmen reported.

Prices are as follows: hard-disk controller card, \$630; hard-disk mechanism, backplane, \$120; disk-to-controller cable, \$150; and ST506 hard-disk controller card, \$490.

The internal hard-disk subsystems cost \$1,625 for 20M bytes and \$2,396 for 40M bytes.

HP, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Printers/plotters/peripherals

Electrohome Ltd. has introduced the ECM 1311, a color monitor said to accommodate multiple add-on cards.

According to the vendor, the monitor offers 720 by 540 dot/in. resolution and features an automatic frequency adjustment facility that allows it to interface with a personal computer using any add-on color card with a frequency range from 15 to 34 KHz.

The ECM 1311 is a red-green-blue monitor.

It costs \$1,195.

Electrohome, 809 Wellington St. N., Kitchener, Ont., Canada N2G 4J6.

*

Cyberlogic, Inc. has introduced the Datapax, a bar code reader said to simplify bar code data entry into personal computers.

The Datapax installs between the keyboard and terminal. It offers keyboard emulation, uses no computer slot, does not require a serial port, does not interfere with keyboard operation and does not use a separate power source.

Models are available for the IBM Personal Computer, Personal Computer XT and AT; Apple Computer, Inc. Macintosh; NCR Corp. Personal Computer; AT&T PC 6300; and other personal computers.

Datapax costs \$375.

Cyberlogic, P.O. Box 16644, Rocky River, Ohio 44116.

Board-level devices

Calpak Systems, Inc. has introduced the Super 8 MHz PC/XT Engine, a 4.7 or 8 MHz Intel Corp. 8088/2 IBM Personal Computer/Personal Computer XT motherboard.

It accepts either IBM or industrial keyboards for rack mount and runs at 4.7 or 8 MHz, selectable from the keyboard during applications. Up to 640K bytes of memory are available.

Hardware is compatible with IBM bus expansion cards, and there is an external reset plug on the board. It also supports enhanced color graphic cards.

ics cards.

The engine costs \$645 with 640K bytes, \$595 with \$256K bytes and \$345 with zero kilobytes installed.

Calpak Systems, 1161 E. Sandhill Ave., Carson, Calif. 90745.

*

Redshift Ltd. has announced the ImageSync Card for Apple Computer, Inc.'s Apple II series computers.

The card is said to provide a full grayscale display for graphics and video processing.

The image is displayed on the Apple monitor and is overlaid on the regular Apple text or graphics display.

Imageworks can reportedly be used to display any digitized image information.

Imageworks costs \$195.

There is a color option that costs \$895.

Redshift, Suite 185, 101 First St., Los Altos, Calif. 94022.

Services

Microsoft Corp. has announced the Microsoft Reference Library, a series of reference books of technical data covering Microsoft operating systems, languages and applications software.

The first volume in the series is MS-DOS Versions 1 to 3.2. It is called the *MS-DOS Technical Reference Encyclopedia* and covers topics including a history, internal system calls, register charts, graphical flowcharts and a table of all possible error codes, according to spokesman.

The *MS-DOS Technical Reference Encyclopedia* will be published in

June, Microsoft spokesmen said.

It costs \$134.95.

Microsoft, 10700 Northrup Way, Box 97200, Bellevue, Wash. 98009.

Auxiliary equipment

Cabbage Cases, Inc. has introduced the Light-Flite computer carrying case.

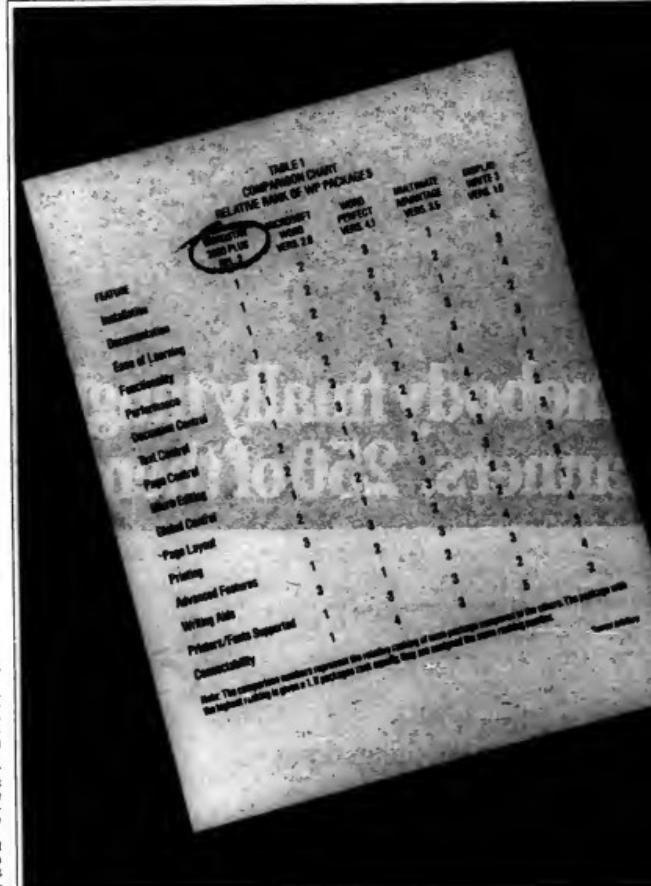
The Light-Flite features built-in tilt wheels and a built-in extension handle, according to Cabbage Cases spokesmen.

It is said to hold an IBM Personal Computer packed in 1-in. polyester foam.

When not in use, the extension handle slips back into the carrying case.

The Light-Flite costs \$205.

Cabbage Cases, 2458 Wood Ave., Columbus, Ohio 43221.



NEW PRODUCTS/MICROCOMPUTERS

RT Systems, Inc. has announced its Keytrac product, a microprocessor-based electronic lock key access system.

The IBM Personal Computer-compatible Keytrac system consists of a monitor, keyboard and electronic key panel, RT Systems spokesman reported.

Each key panel has space for 60 key grips. Each grip is attached to a key or keys and then locked into the panel.

According to the vendor, an authorized panel can be typed into the Keytrac terminal; the wired panel to release a key.

Keytrac also generates reports, the vendor said.

The cost of a Keytrac 60-space key panel is \$4,000.

RT Systems, P.O. Box 809, Allen, Texas 75002.

COMMUNICATIONS

Controllers

Solid State Systems, Inc. has announced the CEO Automatic Call Distributor.

The product is said to provide for over 200 trunks and 125 agent distributed.

CEO Automatic Call Distributor reportedly provides for management reporting statistics and may be utilized as a fully featured private branch exchange/automatic call distributor.

Prices for the product range from \$600 to \$1,000 per line installed, according to Solid State Systems' spokesman.

Solid State Systems, 1300 Shallow Road N.W., Kennesaw, Ga. 30144.

Software

Campaigner, an automated tele-marketing system that accommodates up to 24 users on Northern Telecom, Inc.'s Meridian DV-1 data/value system, has bowed from Open Systems.

The software reportedly provides automatic dialing, scripting via decision matrices with answers and associated weighted values plus discrete supervisor and operator functionality.

Written in C, Campaigner also generates management reports, prospect records and follow-up correspondence.

It follows up leads automatically by day and time, according to the vendor.

Campaigner will reportedly be available in April for about \$15,000.

depending on system configuration. Opus, 20251 Century Blvd., Germantown, Md. 20874.

■

Instant Information, Inc. has introduced **Instantcom**, software designed specifically for use with Western Union Co.'s EasyLink, ITT's Dialcom and Timetran electronic mail and telex services.

Instantcom is function-specific to each service, according to vendor spokesmen.

It comes with its own word processor.

For EasyLink and Dialcom, it reportedly offers transfer capability of binary files.

With a 1,200 bit/sec. Hayes Microcomputer Products, Inc.-compatible modem, it costs \$379, the vendor reported.

Instant Information, Suite 380, 1100 S.W. Boones Ferry Road, Lake Oswego, Ore. 97034.

■

Fischer-Innis Systems Corp. has introduced **Release 2.5** of its Electronic Mail Communication Center (Emcc) system.

The new release includes the Emcc/IBM Distributed Office Support System interface, an electronic forms feature and extended IBM 3270-type printer support.

Other features include scrolling in baskets and out baskets, bulletin boards for electronic network conferencing, mailing lists and electronic file sharing.

The vendor said the MVS version leases for \$800/mo. The CMS version leases for \$700/mo. The VSE version leases for \$500/mo.

Purchase prices start at \$18,000 for MVS, \$16,000 for CMS and \$14,000 for VSE.

Fischer-Innis Corp., 4175 Merchantile Ave., Naples, Fla. 33942.

Multiplexers/modems

Compu-Mech has introduced the CD4000/E/FX full-duplex modem.

The modem is a radio frequency transceiver that is said to allow up to 63 remote locations to be linked in a network. It operates at 1,200 bit/sec.

Features include a full-duplex serial ASCII channel over a radio frequency link; 16-bit cyclic redundancy check error checking with automatic retransmission; RS-232, RS-422, RS-423, RS-485 serial interfaces.

The modem costs \$1,800. Compu-Mech, Suite 75, 5242 Angola Road, Toledo, Ohio 43615.

■

Telxon Corp. has introduced the Autonet Modem Eliminator and the Cable Converter Unit CCU-V-35.

The Modem Eliminator is said to replace two synchronous modems and to multiplex and transmit all RS-232 signals over four-wire cable at distances up to 1,000 feet. It offers selectable transfer rates of 1,200, 2,400, 4,800, 9,600 and 19.2K bit/sec.

The CCU-V-35 is said to provide transmission rates up to 64K bit/sec. or 256K bit/sec. It transmits 16 V.35 interface signals up to 1,000 feet.

The Modem Eliminator costs \$120, and the CCU-V-35 costs \$130.

Telxon, 602 Pleasant Valley Drive, Moorestown, N.J. 08047.

SINK YOUR TEETH INTO THIS.

Introducing WordStar® 2000 Plus Release 2, the new and improved software that topped InfoCorp's chart of word processing packages.

We could make all kinds of claims about our new WordStar 2000 Plus Release 2.

About its comprehensive commands, tutorials for easy training, Direct Lotus® file input, extensive printer support, DCA connectivity, LANs and site licensing options.

That would be easy to do.

But we decided to let the experts do the talking.

In a comparative report—the report containing the chart to the left—Robert Leftwich of InfoCorp said:

DisplayLink™, International Data Corporation's Jim Chapman concluded

"WordStar 2000
is our favorite—for ease of learning, ease of use...and for well-conceived and helpful documentation."

Now we don't expect you to take these opinions as gospel.

Because when it comes to knowing your company's word processing needs, you're the expert who really matters.

So evaluate our product yourself.

Visit your local MicroPro dealer today or call 800-227-6703 800-532-7979 in California for the dealer nearest you. Put WordStar 2000 Plus Release 2 to the test and see how it measures up to the advance reviews we believe it'll be time well spent. For you and your company.

If you'd like the complete InfoCorp and IDC reports, we'll be happy to send them to you. Just fill out the coupon below and mail it to us, or call 800-443-0100 x 547.



MicroPro®

"WS 2000+ emerges as a clear winner in overall applicability. InfoCorp believes WS 2000+ would appeal to the largest number and widest variety of users. Its layered functionality, ease of learning, and excellent communications features make it ideal for corporate users, ranging from secretaries to clerks to managers to executives."

And, after reviewing WordStar 2000 Plus Release 2 alongside MultiMate® Advantage™ and IBM's

WORDSTAR®

RELEASE 2

Powerful word processing has never been easier.™

Learn more about WordStar 2000 Plus Release 2 and other MicroPro products by calling 800-227-6703 or writing to MicroPro International, Industry Analyst Reports, P.O. Box 57135, Hayward, CA 94545. Yes, I'd like copies of the IDC and IDC Reports on WordStar 2000 Plus Release 2. Please send them to me right away.

Name: _____
Title: _____
Company: _____
Address: _____
State: _____ Zip: _____
Phone: _____

MicroPro International, Inc.
1000 Corporate Park, Hayward, CA 94545
Telephone: 800-227-6703, 415-785-1000
Telex: 73-22760
Fax: 415-785-1000

NEW PRODUCTS/COMMUNICATIONS

Local-area networks

David Systems, Inc. has added the David Coax Eliminator and the David Analog Set Adapter to its David Information Manager Ethernet-compatible integrated voice and local-area network.

The 3270 Coax Eliminator links IBM 3270 display stations to IBM control units over standard twisted-pair telephone wire at distances up to 3,000 feet.

The Analog Set Adapter allows customers to use existing analog telephone sets to gain access to the David Information Manager.

Pricing starts at \$225 per connection.

David Systems, 701 E. Evelyn Ave., Sunnyvale, Calif. 94086.

Network services

Dovtrex, a data-over-voice switching system for networking data in existing Centrex or private branch exchange telephone systems has debuted from Gandalf Data, Inc.

The system supports data networking up to 64K bit/sec over two-wire pairs without affecting voice network operations.

Each switching node can support from eight to 740 users and attached devices. By networking nodes together, up to 23,500 users and attached devices can be served.

Prices, including full redundancy, range from about \$450 per attached device for a system serving 740 devices to \$550 per attached device in a system serving 128 devices.

Gandalf Data, 1020 S. Noel, Wheeling, Ill. 60090.

Xyplex, Inc. has unveiled an Ethernet-compatible version of its Xyplex communications system for Digital Equipment Corp. computers.

VAX users in an Ethernet environment can access the Xyplex system without having to install any additional cabling, regardless of whether the environment is a single Ethernet system or consists of multiple local-area networks with a corporatewide broadband system.

The host interface unit and cluster controller cost \$3,700 and \$2,575, respectively.

Xyplex, 100 Domino Drive, Concord, Mass. 01742.

Innovative Electronics, Inc. has announced Netmaster, a retail system said to interface the NCR Corp. point-of-sale terminals to an IBM Systems Network Architecture mainframe.

Netmaster consists of two elements: Netmaster/AP, a host-resident Cobol application program that performs configuration, control and monitoring of the network, and Netmaster/IS, an in-store multifunction computer that provides the interface. Netmaster is priced ranging from \$5,000 to \$15,000.

Innovative Electronics, 4714 N.W. 168th St., Miami, Fla. 33014.

Cisco Systems, Inc. has announced Release 1.5 of Net/Master, its network management system.

The release supports IBM's MVS/XA. The multiple-session support has

been enhanced as well as the network access, the advanced network management component and the file transfer component. General enhancements include a tracing facility to trace up to 10 sessions, a tutorial facility and the user-access management system data set.

Release 1.5 of Net/Master will be provided to current users at no charge. Net/Master is priced from \$15,000.

Cisco Systems, 2300 Montana Ave., Cincinnati, Ohio 45211.

Test equipment

Northern Telecom, Inc. has announced the Interface Display Panel 816 (IDP-816) and the Digital Patch Unit 2408A (DPU-2408A), two technical control products for monitoring data communications networks.

The IDP-816 is a full-function matrix switch with computer control

The IDP-816 monitors data signals on 16 RS-232 lines without affecting communications.

Audible and visual alarms are provided.

The DPU-2408A provides non-blocking digital patching, monitoring and test access capabilities.

The IDP-816 is priced at \$1,150, and the DPU-2408A costs \$1,900.

Northern Telecom, 344 New Albany Road, Moorestown, N.J. 08067.

added, the vendor said.

The product was designed for multivendor data networks starting at 50 lines and supports up to eight local or remote workstations, according to the vendor.

The IM 3000 supports most industry standard interfaces including analog and V.35 interfaces at speeds up to 30KB bit/sec.

The IM 3000 costs \$82,000.

Northern Telecom, 344 New Albany Road, Moorestown, N.J. 08067.

Teltronix Corp. has introduced the Model 1970 application cartridge said to provide its Portascope with testing and simulation within IBM's Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) network environments.

VAR PART.



A good looking part.



A key part.



A powerful part.



A new part.



A small part.



A fast part.



A unique part.



A spare part.

NEW PRODUCTS/COMMUNICATIONS

Both active and passive testing routines are available. Scan and trace buffers allow step-by-step review of any test sequence following execution. Any DAF, GAF or other protocol can be captured and examined and captured using start and stop traps and bit masks. All captured information can be decoded in SDLC or SINA formats or in hexadecimal.

The Model 1070 application cartridge costs \$200.

Telenex, 502 Pleasant Valley Ave., Moorestown, N.J. 08057.

Auxiliary equipment

DB Delta Computer Systems, Inc. has released Call Reporter, a telephone call reporting system designed to run on IBM Personal Computers and compatibles.

Call Reporter connects to a private

automatic branch exchange (PBX), collecting call information from the PBX system's connection management detail register output via the RS-232 port. The system allows users to input hourly labor rates, per-minute telephone charge rates and up to 10 categories of overhead items that are apportioned to each of up to 200 extensions on a per-minute basis.

Call Reporter costs \$495.

DB Delta Computer Systems, Suite 280, 19725 Sherman Way, Canoga Park, Calif. 91306.

Network Systems Corp. has announced the Hyperchannel B series line of adapters said to provide communications among workstations, mainframes and personal computers at 10M bit/sec.

Included in the B series are the BC222 adapter, which connects to the IBM 4300, 3080 and 3090 series; the BC110 adapter, which connects to Cyber 70, 170, 700 and 800 series mainframes from Control Data Corp.; the BC403 adapter, which connects up to four minicomputers, workstations or routers via a coprocessor board; and the PC Dataport PI270 and PI370 coprocessor boards, which allow an IBM Personal Computer or Personal Computer XT to function concurrently in one of three modes, according to the vendor.

Prices for the average network connection are said to be as follows: \$20,000 for the BC110 and the BC222; \$9,600 for the BC403; \$995 for the PC Dataport PI270 and \$1,295 for the PI370.

Network Systems, 7600 Boone Ave. N., Minneapolis, Minn. 55428.

SYSTEMS & PERIPHERALS**Turnkey systems**

Digital Equipment Corp. has announced the Vaxlab Real-time Workstation, designed for laboratory data acquisition and experiment control, that incorporates the Microvax II system.

The workstation is a 32-bit word-length system. It is said to be available in both single-user and multiuser versions.

A single-user configuration includes 2M bytes of memory, a 71-Mbyte disk, a 95-Mbyte cartridge tape drive, DECnet and Ethernet connecting hardware, a graphics subsystem, real-time clock and associated software.

The multiuser version incorporates an eight-line communications interface in place of the graphics subsystem.

Vaxlab systems are priced from \$29,055.

DEC, Maynard, Mass. 01754.

Processors

Integrated Digital Products has introduced the 5 MIPS Whetstone processor.

The 5 MIPS Whetstone was designed for applications requiring support of eight to 32 ports. According to the vendor, it executes instructions in 200 nsec. It offers standard onboard memory capacity of 128K bytes, expandable to 32M bytes. It can be upgraded to the vendor's 100 and 600 MHz CPUs.

The 5 MIPS Whetstone costs \$10,500.

Integrated Digital Products, 4206 E. La Palma Ave., Anaheim, Calif. 92807.

L/F Technologies, Inc. has introduced the LFT 1650, a 30-user computer said to allow for more users, more mass storage and fully integrated backup power to Software 2000 Inc.'s TurboDOS operating environment.

The LFT 1650 supports up to 30 user boards, each with a dedicated 80186 processor and 1M byte of random-access memory. It also supports up to three 140M-byte Winchester drives, two 8-in. floppy disk drives and one 5½-in. floppy drive.

Prices start at \$7,495.

L/F Technologies, 2800 Lockheed Way, Carson City, Nev. 89701.

NCR Corp. has added the NCR 9300IP and 9400IP models to its NCR 9000 family of interactive computer systems.

Both systems use NCR's ITX operating system and 32-bit very large-scale integration technology. Both systems contain an integrated 45M-byte, 14-processor, 64-bit RISC unit and an integrated 72M-byte, 512-bit Winchester fixed disk. They both support small computer systems interface disks, magnetic tapes and printers as well as a variety of communications protocols.

The NCR 9300IP is priced from \$50,075. The NCR 9400IP is priced from \$76,075.

NCR, 1700 S. Patterson Blvd., Dayton, Ohio 45479.

OUR PART.

Of all the parts we offer VARs, the one that counts most is the part we play in bringing your product to market. Our part is the complete Epson® VAR package: the service you need, superior sales and technical support, plus documentation that covers all the nuts and bolts. Add one year warranty, a tool kit and a technical team to speed up your hardware and software development. What's in it for you? Your system gets to market a lot faster.

With Epson products, you'll satisfy even your toughest customers. Start with our Equity™ line of PC compatible computers which offer more features and better performance than the corresponding IBM® PC, XT, and AT™ models. And there's our exclusive VAR PC, the QX-11™.

Need on-the-road power? We've got the competition all boxed in with the suc-

cessful HX-20® and the Geneva™ PX-8 portable computers. Another exclusive VAR product, is a 3.5 lb. laptop with the ultimate in modular peripherals. Need special gear for special systems? We have bar code readers, ROM capsules, RAM disks, micro-cassettes, modems, multimeters, and disk drives. Everything is modular. Plug them in and you're ready for action.

Round out your system with a reliable Epson printer. Tiny microprinters, battery-powered units, plotters, color printers, ink jet, daisy wheel, and letter quality dot matrix machines.

All the best parts from the best partner. Epson. To see what part we can play in your future, call us at (800) 421-5426 or (213) 539-9140 in California, or write to our Director of VAR Sales at 2780 Lorieta Blvd., Torrance, California 90505.

Visit the Epson showroom during VAR Congress at Dallas Infomart, March 18-20.

EPSON
THE BEST PART

NEW PRODUCTS/SYSTEMS & PERIPHERALS

Digital Equipment Corp. has announced the IPQ83, the IPUS3 and the IPUE3 industrial I/O members of the Personal Automation Systems (PAS) family.

The IPQ83 includes DEC's industrial I/O subsystem with the Micro/PDP-11/83 computer.

The other two PAS members are said to incorporate a subsystem chassis with Uni bus architecture PDP-11/24 and PDP-11/84 minicomputers.

According to the vendor, all three are expandable up to 80 process I/O modules and screw terminals.

The products run under the RSX-11 operating system.

DEC Q-bus systems are priced from \$30,000, the vendor said.

The price of the Unibus PDP-11/24 and PDP-11/84 systems start at \$29,750 and \$35,000, respectively.

DEC, Maynard, Mass. 01754.

Data storage

Telebyte Technology, Inc. has announced the TDX-45/5360, a 14-in. magnetic tape system for the IBM System/34 and 36 and IBM 5362 and 5364.

The tape system can be set to transfer data at the maximum speed of the communications line — 29.8K bit/sec. or 56K bit/sec or 10M to 14M bytes per hour. It also comes with a bisynchronous interface and a tape utility software package.

The TDX-45/5360 costs \$8,950.

Telebyte Technology, 270 E. Pulaski Road, Greenlawn, N.Y. 11740.

DY-4 Systems, Inc. has added the DVME-715 intelligent SIMD Disk Controller to its family of VMEbus modules.

The DVME-715 is said to be an intelligent I/O controller.

ler that can support up to two SMD-compatible disk drives. It includes a Motorola, Inc. 68000 CPU with 64K bytes of dynamic random-access memory, a discrete direct memory access controller and a burst error processor for error detection and correction.

Other features include data transfer rates to 20M bit/sec., 32-bit addressing and 16- or 32-bit transfers to or from VMEbus.

The DVME-715 costs \$2,697.

DY-4 Systems, Suite 202, 1475 S. Bascom Ave., Campbell, Calif. 95008.

EMC Corp. has announced the VXE6-16MB, a 16M-byte memory expansion board featuring 16-bit random-access memory technology, for Digital Equipment Corp.'s VAX 8600 and 8650 computers.

The board is said to allow the VAX systems to be configured up to 128M bytes of physical memory. It provides 16.4M bytes of main memory per board and allows system configurations with 4M-byte and/or 16M-byte boards up to 128M bytes.

The VXE6-16MB costs \$68,000.

EMC, 12 Mercer Road, Natick, Mass. 01760.

Terminals

Soroc Technology, Inc. has announced the Elite, a Tandem Computers, Inc. compatible terminal.

The Elite is a 14-in. tilt-screen terminal said to emulate Tandem's 6530 family. It features a green phosphor screen, display memory support with 300 lines or 12 pages in block mode; menu screen configuration, asynchronous communications, half or full duplex, supporting RS-232C and current loop interface; serial printer port; and optional integrated 300/1,200 bit/sec. modem.

The Elite costs \$995. Soroc, 151 Freedom Ave., Anaheim, Calif. 92801.

DASD contention is enough to make you tear your hair out.

Nothing will bring an enormous mainframe to its knees faster than DASD contention. Thousands of inquiries all heading for the same pack at the same time. Or read heads jumping inefficiently back and forth and suddenly the "wait" light is on more than it's off. Fight back with FastDASD.

FastDASD automates DASD management. The FastDASD Collector will be better equipped to handle DASD contention, making their SDF and dclm at a fraction of the system overhead caused by GTF.

Then the FastDASD Analyzer will show where troublesome data sets are located, give you the optimal data set reorganization plan, show you exactly how much seek time would be reduced if you followed that plan, and even generate the IBCOPY or COMPACTOR control cards to do the reorganization.

At UCCEL Express, we sell inexpensive software products that can

make a high-priced difference in the way your mainframe behaves. You'd have to agree, \$9,900 to get DASD contention completely out of the picture could be the best software investment around.

EXPRESS UCCEL Express Software
Box 1105, Herndon, VA 22070, (703) 471-1545

Yes, I want DASD contention out of my life. Send me more information.

Name _____ Company _____ Phone (____)

Address _____ City _____ State _____ Zip _____

OS/VS _____ CPU _____ #DASD _____

For immediate assistance call toll-free, 1-800-365-7628

Cheap Fixes For Your Mainframe.

IBM has announced the 3164 ASCII Color Display Station said to offer eight colors on a high-resolution 14-in., 80-char. by 25-line monitor.

The 3164 is upwardly compatible from the 3161 and 3165 displays. In native mode, it will default to four colors.

Features of the display include keyboard with 12 definable function keys and a numeric keypad, RS-232C and RS-422A communications ports and selectable speeds to 19.2K bit/sec.

Prices for the 3164 start at \$725.

IBM, Old Orchard Road, Armonk, N.Y. 10504.



NEW PRODUCTS/SYSTEMS & PERIPHERALS

Printers/plotters

Tektronix, Inc. has announced the CX4602S IBM-compatible Color Graphics Output System.

The system is said to provide color output for IBM 3270 environments. It combines the vendor's 4692 Color Graphics Copier with the CX4510A Color Graphics Rasterizer.

The system can be used with MVS and VM operating systems. The base price is \$14,995.

Tektronix, P.O. Box 1700, Beaverton, Ore. 97075.

Tandem Computers, Inc. has announced two line printers for use with the company's Nonstop systems: the 5515 desktop model and the 5516 free-standing model.

The 5515 is said to print at 300 line/min, and the 5516 is said to print at speeds up to 600 line/min. Both feature Matrix technology and a self-diagnostic feature.

The 5515 model costs \$7,200, and the 5516 model costs \$11,900.

Tandem Computers, 19333 Valley Pkwy., Cupertino, Calif. 95014.

Gerber Scientific Instrument Co. has added the Model 5488 to its Autoprep 5000 automated stripping system and its family of graphics arts equipment.

The Model 5488 reportedly offers precision photoplotting, cutting or scribbing at speeds of 3,600 in./min as

well as a 40- by 48-in. photoplotting area. Another feature is off-line operation, allowing it to plot one job while another is being input.

The Model 5488 costs \$122,000, including photoplotting head.

Gerber Scientific, P.O. Box 305, Hartford, Conn. 06101.

Power supplies

Todd Products Corp. has added the MDT-400 series to its line of multioutput switching power supplies.

The MDT-400 series includes models with a 50A to 60A 5V output with load and line regulation of plus or minus 1%. The components are surface mounted to the underside of the board.

Prices start at \$535.

Todd Products, 60 Emjay Blvd., Brentwood, N.Y. 11717.

Dispex, Inc. has announced the Dispex PLC series line conditioners featuring a surge-protected RJ-11 data link and a plug-in AC power surge suppressor.

The series protects electronic equipment against voltage spikes and surges.

The Dispex PLC series has a noise reduction of 130dB common mode and 80dB normal mode.

Units are available in 500VA, 1, 2 and 3-kVA power ratings. Prices range from \$395 to \$935.

Dispex, 1 Alexander Place, Glen Cove, N.Y. 11542.

Kalgo Electronics Co. has announced the Line Saver, a standby uninterruptible power system.

The Line Saver was designed to provide standby backup power in 120V or 240V, 60 Hz or 50 Hz with 250W capacity. The unit uses pulse-width modulation technology.

The unit has a 6-ft detachable three-prong grounded cord set with a CEE-22 connector.

The Line Saver costs \$549.

Kalgo Electronics, Department CP, 6584 Buch Road, Bethlehem, Pa. 18017.

Components

Dated has announced the ST-702 analog I/O board and the ST-701 analog-to-digital coprocessor board for Intel Corp. Multibus-based computers.

The ST-701 was designed to off-load its host Multibus central processor. The ST-702 is suited for thermocouple measurements. It offers isolation, 60Hz line rejection and screw terminal input terminations.

The ST-701 is priced ranging from \$1,255 to \$1,685. The ST-702 is priced at \$1,095.

Dated, 11 Cabot Blvd., Mansfield, Mass. 02048.

Datacube, Inc. has introduced Minivideo, a real-time image processing subsystem, and has added three modules to its Maxvideo product line.

Minivideo-10 and Minivideo-7 are

512- by 512- by 8-bit and 384- by 512- by 8-bit resolution boards for Intel Corp.'s Multibus or Ibx-based computers. Both are said to provide full video image acquisition, signal processing, storage and display capabilities.

The Maxvideo boards are Max-XPS, a real-time image transposing frame store module; Addigen-1, an address generator module; and interpolator, a multirate sampling module with subpixel precision.

Minivideo-10 costs \$5,995. Minivideo-7 costs \$4,995. Max-XPS and interpolator cost \$3,215 and Addigen-1 costs \$1,200.

Datacube, 4 Dearborn Road, Peabody, Mass. 01960.

DSP Systems Corp. has announced the VAP-FS Frame Store, said to be capable of storing a snapshot of 50-MHz data.

The Frame Store is VMEbus compatible and can capture up to 32K 16-bit words in snapshot mode. The Frame Store is reported to a 2½-port memory.

The half port is used to write data, and the other two ports control the starting address, word count and data acquisition trigger. When the acquisition is completed, each full port can simultaneously read or write locations with the 32K-word memory.

The VAP-FS Frame Store costs \$2,400.

DSP Systems, M/S-E, 1081 N. Shepard, Anaheim, Calif. 92806.

A Few Words About NET/MASTER. For Your SNA/VTAM Network.

NET/MASTER from Cincom® is a complete set of integrated components that will maximize the capabilities of your VTAM network.

Each component satisfies the demands of a specific network situation. While all components together provide optimum VTAM effectiveness.

But whether your VTAM network needs are specific or comprehensive, it's important to remember that NET/MASTER is . . .

NEW PRODUCTS/SYSTEMS & PERIPHERALS

Auxiliary equipment

Safety Screen for VDTs has bowed from Novatek Corp.

The product enhances contrast, reduces noise and attenuates radiation on monochrome, color and high-resolution VDTs, the vendor claimed.

The device is said to shield VDT operators from very low-frequency electrical emissions.

Safety Screen sells for \$65.

Novatek, 14 Commercial Blvd., Novato, Calif. 94947.

Salisbury Industries has announced **DataSafe Document Security System**, a lockbox system said to provide secured hard-disk storage.

DataSafe uses key locks similar to those used in U.S. Postal Service post office boxes. It is available in a double-entry design for communicating walls and in a Roll-A-Bout wheeled version.

Prices start at \$149 for one single-entry wall-mounted module. The Roll-A-Bout starts at \$220.

Salisbury Industries, 1010 E. 62nd St., Los Angeles, Calif. 90001.

Curtis Manufacturing Co. has introduced the **Touch Me First static mat** system.

The static mat was designed to eliminate static discharge, thereby protecting computers and other electronic equipment from blown chips, lost data and other problems. The

mat is placed beneath the system, and the user simply touches it to discharge static electricity before touching the system.

The Touch Me First static mat is priced at \$39.95.

Curtis Manufacturing, 305 Union St., Peterborough, N.H. 03458.

The Harris/Lanier Business Information Systems Thought Processing Division of Lanier Business Products has announced the **Light-Pen Identification station** as an accessory to its systems dictation product line.

The Light-Pen Identification is said to read bar codes generated by the vendor's Barcode Label Production Unit. The bar code maker consists of a custom Lanier interface, the Lanier Concept 1200 workstation, keyboard and a letter-quality, high-speed printer. The new accessory is available on all Lanier central system dictation products.

The Light-Pen system retails for \$345. The barcode printer, interface and keyboard cost \$2,200.

Harris/Lanier, 1700 Chantilly Drive N.E., Atlanta, Ga. 30324.

Interaction Systems, Inc. has introduced the **Series 3000 Touch Screen** for interactive video applications.

The continuous-touch 19-in. screen can reportedly be installed in most monitors with total electrode

concealment. It features a 4-in. electrode system around the edge and provides better than 80% light transmission. It is installed with a double-faced adhesive gasket and is aligned by touching four points on the screen.

The Series 3000 Touch Screen, including controller board, costs \$395.

Interaction Systems, 24 Monroe St., Newtonville, Mass. 02160.

PRICE REDUCTIONS

Hemmings Morse, Inc. has released **Version 2 of its Focus: ABC Audit and Focus: ABC Compilation audit software** and reduced their prices.

Version 2 of both programs is fully compatible with Lotus Development Corp. 1-2-3 Release 2. The new pricing is as follows: Focus: ABC Audit costs \$495 for a machine license and \$1,495 for an office license. Focus: ABC Compilation costs \$295 for a machine license and \$995 for an office license.

Hemmings Morse, #320, 1700 S. El Camino Real, San Mateo, Calif. 94402.

Verticom, Inc. has announced a price reduction for its M-16 and M-256 graphics boards.

The suggested list prices are now \$1,695 for the M-16 color graphics controller and \$1,295 for the M-256 color graphics controller. The CD-1 color display costs \$995.

Verticom, 545 Weddell Drive, Sunnyside, Calif. 94089.

Peachtree Software, Inc. has announced a price reduction for its **Back to Basics accounting system for the Apple Computer**, Macintosh.

Back to Basics is a double-entry, accrual accounting system. It includes general ledger, accounts receivable and accounts payable software, which are now available bundled into a "3 pack."

The 3 pak costs \$395. Individual modules cost \$175 each.

Peachtree Software, 4344 International Blvd., Norcross, Ga. 30093.

Metatek, Inc. has dropped the price of its **Metascope-PC**.

The Metascope-PC is a hardware/software extension to the IBM Personal Computer said to provide a means for users to easily add a place stand-alone monitor. It supports synchronous and asynchronous protocols at speeds up to 19.2K bit/sec. The new price is \$1,595.

Metatek, P.O. Box 33129, 290 Coon Rapids Blvd. N.W., Minneapolis, Minn. 55433.

Effective.

NET/MASTER™ Multiple Application Component saves time and money in your SNA/VTAM network.

This is a test. Do you know how much time and money your VTAM users waste each time they sign-on/sign-off to switch between CICS and TSO?

Figure a minimum of 3 minutes waiting time per switch. With 20 switches per day per user. Then multiply by your number of users. By your average hourly rate. By the number of work days per year.

Better yet, call us. And we'll give you the answer. Our NET/MASTER Multiple Application Component. Free. For 30 days.

With NET/MASTER, a single key provides immediate switching between multiple applications in a variety of environments (CICS, TSO, IMS, VM/CMS, etc.) — anywhere in your VTAM network.

Just call the toll-free number below. In Canada or Ohio call 513-661-6000.

1-800-543-3010

More.

NET/MASTER™ Management Component increases service levels to your SNA/VTAM users.

NET/MASTER automates many of the error-prone VTAM and subsystem processes in your network.

Thus, you get more availability from your network than you ever thought possible. From increased user service levels to improved management and control of your VTAM network and subsystems.

And for a limited time, we'll give you more VTAM availability for less than usual. Free. Through our 30-day, NET/MASTER trial offer.

Just call the toll-free number below. In Canada or Ohio call 513-661-6000.

1-800-543-3010



CALENDAR

WEEK OF MARCH 9

MARCH 10-14, NEW YORK — Modern Structured Analysis Workshop. Contact: Palmer Consulting, 353 W. 12th St., New York, N.Y. 10014.

MARCH 11-14, AMSTERDAM — Retail Europe '86. Contact: Spectra, Spectra House, 99 Piccadilly St., Westminster, London W1A 1LA, England.

MARCH 12-14, DETROIT — Artificial Intelligence for the Automotive Industry — The Demystification. Contact: Dale Mason, Technical Activities Department, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

MARCH 13, NEWTON, MASS. — AWC — Where's the Money: What are the High-Priority Areas for the Fast Track? Contact: Deborah Dupree, Program Director, Association for Women in Computing, Suite 21, 66 Chiswick Road, Brookline, Mass. 02146.

WEEK OF MARCH 16

MARCH 17, BOSTON — Establishing the Executive Workstation. Contact: Diane Rodgers, DMT Associates, Inc., 57 River St., Wellesley

Hills, Mass. 02151.

MARCH 17-19, ORLANDO, FLA. — Managing and Motivating for Improved Productivity. Contact: Marilyn S. Nichols, Exec. Mgmt. Assn., P.O. Box 16711, Stamford, Conn. 06905.

MARCH 17-19, HONG KONG — Conference on Computer Control, Audit & Security in Banking and Finance. Contact: Chairman, P.O. Box 212, Georgetown, Ont., Canada L7G 4Y5.

MARCH 17-20, WASHINGTON, D.C. — Software Development for Government. Contact: Conference Institute, U.S. Professional Development Institute, 1620 Elton Road, Silver Spring, Md. 20903.

MARCH 17-21, BALTIMORE — Basic Systems Analysis. Contact: Thomas J. Bisacquino, Director of Education, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138.

MARCH 17-21, BOSTON — James Martin's Productivity Seminar. Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402. Also being held March 24-28 in Washington, D.C.

MARCH 17-21, MILWAUKEE — Test Data Acquisition and Processing for Instrumentation Applications. Contact: John T. Snedeker, Program Director, Center for Continuing Engineering Education, University of Wisconsin-Milwaukee, 929 N. Sixth St., Milwaukee, Wis. 53203.

MARCH 18, SAN JOSE, CALIF. — U.S. Invitational Computer Conference Series. Contact: Suzanne Huhner, U.S. Conference Director,

The Invitational Computer Conference, No. C-2, 3151 Airway Ave., Costa Mesa, Calif. 92626.

MARCH 18-20, ALBUQUERQUE, N.M. — Integrated Fiber-Optic Technology Training. Contact: Linda Castle, Optoelectronic System Consultants, P.O. Box 35625, Albuquerque, N.M. 87176.

MARCH 18-21, LAS VEGAS — Check Processing. Contact: Peggy Meyer, Bank Administration Institute, 10 Gould Center, Rolling Meadows, Ill. 60008.

MARCH 19-20, NEW YORK — The 1986 Strategic Planning Conference. Contact: The Conference Board, Inc., P.O. Box 4026, Church St. Station, New York 10261.

MARCH 19-21, LAS VEGAS — CDLA Spring Meeting. Contact: Dianne L. Sims, Manager of Convention Planning, Computer Decision-Lesson Association, Inc., 1212 Madison St., N.W., Washington, D.C. 20007.

MARCH 19-21, BLACKSBURG, VA. — Personal Computer Interfacing for Scientific Instrument Automation. Contact: Linda Leffel, Virginia Polytechnic Institute and State University, Blacksburg, Va. 24061.

Mich. 48121.

MARCH 24-26, LAS VEGAS — Fifth Annual International Spectrum USA. Contact: Amy Kralinck, International Data Base Management Association, Suite 104, 9740 Appariono Road, San Diego, Calif. 92131.

MARCH 24-26, LAUREL, MD. — Association for Computer Machinery's Conference on Ada Use in Every Practical Lesson in Perspective. Contact: Connie Flinn, Johns Hopkins University Applied Physics Laboratory Computer Society, Johns Hopkins Road, Laurel, Md. 20707.

MARCH 24-27, SINGAPORE — Artificial Intelligence '86 Conference: AI and its Applications — A State of the Arts Review. Contact: John Tagier, Elsevier Science Publishers, 52 Vanderbilt Ave., New York, N.Y. 10017.

MARCH 26-27, CAMBRIDGE, MASS. — The Lotus Developer Conference. Contact: Mark Scapicchio, Lotus Development Corp., 55 Cambridge Pkwy., Cambridge, Mass. 02142.

WEEK OF MARCH 30

MARCH 31-APRIL 1, NEW YORK — Software Tools Conference on Artificial Intelligence/Expert Systems. Contact: Software Tools Conference Office, Suffolk University, Boston, Mass. 02108.

MARCH 31-APRIL 2, RICHMOND, VA. — The Annual Paransus Management Conference. Contact: Paransus, Inc., 100 Boylston St., Boston, Mass. 02116.

Secure.

NET/MASTER™

Access Component
prevents unauthorized access to your
SNA/VTAM network.

NET/MASTER is a security front door for your network. It stops hackers from ever getting to your application.

What's more, NET/MASTER extends the protection of any existing application security (RACF, ACF2, TOP SECRET, etc.) to your VTAM network.

But, as in most cases, seeing is believing. Especially where security is concerned. So let us install a free, 30-day trial copy of the NET/MASTER Access Component on your system.

At absolutely no risk to your company, you'll see just how secure your network can be.

Just call the toll-free number below. In Canada or Ohio call 513-661-6000.

1-800-543-3010

Free.

NET/MASTER™

SNA/VTAM network components.
Choose any or all

in our 30-day, free trial offer.

This is your no-risk opportunity to make your VTAM network as available, secure, and productive as possible.

Don't pass it up.

Look at your VTAM network. Determine your requirements. And then let us make arrangements for the NET/MASTER components you need. Free. For 30 days.

Just call the toll-free number below. In Canada or Ohio call 513-661-6000.

1-800-543-3010

 **CINCOM**

World Headquarters
2300 Montana Avenue Cincinnati, Ohio 45211

COMPUTER INDUSTRY

AT&T chairman announces retirement in annual report**Document focuses on
divestiture, cost cuts****By Bryan Wilkins**

AT&T Chairman Charles Brown will retire next August, he announced in his message to shareholders in the 1985 AT&T annual report made last week.

Brown's letter to shareholders cited the impending retirement but did not indicate who his successor might be. Speculation has centered on current President James Olson as well as Morris Tannenbaum, executive vice-president.

In his final report as head of the

communications giant, Brown said that the company has regained the initiative since its divestiture in 1984. Brown called the divestiture "the most shattering reorganization in business history."

Reflecting a cost-conscious posture that prevails in the competitive telecommunications industry, the annual report contained wallet-size photos instead of the full-page glossy displays of switching systems that were common in predivestiture days.

With regard to its sluggish sales of computer equipment, AT&T only recited the introduction of "the most complete line of computers in the shortest time of any company in our field."

The annual report did not comment on the consumer response to the Personal Computer 6300 and the 3B line.

The company said it is continuing to expand use of its Unix operating system by aggressively stimulating development of Unix applications programs.

The report emphasized that the communications giant is still wrestling with the reorganization of a company that earned \$34 billion in 1985 revenue. "Cost-reduction has been and will continue to be a major challenge. It became very clear as we entered the hotly competitive postdivestiture environment that our cost structure was too high to achieve a

level of earnings expected of a high technology business," Brown said.

Revenue from the telecommunications side of AT&T's business was \$17.2 billion in 1985, compared with \$15.2 billion in 1984. Its equipment products, which include computers, private branch exchanges and central office switches, achieved sales of \$11.8 billion in 1985, compared with \$10.1 billion in 1984.

Peachtree's niche after the storm

From page 114

Peachtree Software International to foreign distributors.

MSA held onto its micro-mainframe link product called Peachlink, later renamed Expertlink, and Peachtree itself discontinued nonvertical programs such as Decision Management, an integrated package. Rather than fight the heavier-duty Lotus Development Corp., we decided to throw in the towel in that market," Goodhew says.

The company went from 116 employees to its present status of under 50, while sales dropped substantially, according to Goodhew. To stimulate product demand, Peachtree has

**Computer Industry section
begins on page 114.**

MADE FOR EACH OTHER.

Just like Topaz Power Conditioners and your computers.

Noise transients, voltage fluctuations, blackouts—all are problems for computers. But Topaz eliminates these problems with a full range of products: LINE 2 Power Conditioners, ULTRA-ISOLATOR® Noise Suppressors and POWERMAKER® Uninterruptible Power Systems.

Reliable. Affordable. Efficient. Our products are ideal for use with all computers, from micros to mainframes. Call us today at (619) 279-0831. After all, we're made for each other.



TOPAZ®

Excellence in Computer Power
A Subsidiary of the Sanken Company

For your FREE copy of our 16" x 30" MADE FOR EACH OTHER poster, please tear out this ad and send it to us along with your name and address.
Mail to: Topaz, Inc. 950 Topaz Way, San Diego, CA 92123-1864.

shifted its emphasis from distributors to dealers and users.

"I think they are in good hands at Intelligent Systems, and their refocusing of product emphasis is timely," says Ben J. Dyer, a cofounder and the president of Peachtree Software at its beginnings in 1978 as an offering of Intellis Sciences, Inc., a turnkey systems supplier.

"It is a difficult market, so there will be ups and downs. But they have had a lot of good experience in the market as well," says David Ferris, chairman of Ferrin Corp., a micro support firm in San Francisco.

Others are more skeptical. "I think Peachtree will do all right, but I don't think they will make any sort of killing because they just don't have the credibility of a well-established company. There are cheaper and better packages out now, and these will attract more business," said Robin Raskin of International Resource Development, a market research firm in Norwalk, Conn.

In the long run, Peachtree's potential for success is inextricably linked to the future course of microcomputer software. It is no secret that the industry has experienced less than phenomenal growth in the past 12 to 18 months, and no one is quite sure what to expect in 1986.

"Instead of growing at 200% a year as many expected, the microcomputer industry is growing at 35% a year or so," Goodhew estimates. "Because it was less than expected, there were too many players and too many dealers and too many products. Until we reach a level of maturity in the market, this overcapacity is going to continue to kill companies."

Now you can
paint your entire IMS
application system.

APS

**THE APPLICATION
PRODUCTIVITY SYSTEM FOR IMS
AND CICS DEVELOPMENT CENTERS**

APS, the leader in providing productivity savings to IMS and CICS users, now features exciting new painter technology that makes application prototyping and implementation easier and faster. Using APS, your development staff can:

PAINT screens, reports, data structures and programs in a fraction of the time and cost it currently takes.

PAINT a visual "at-a-glance" representation of an entire application system that shows the relationships of all application components.

PAINT prototypes that clearly demonstrate application systems to end users—from simple screen sequences to full working prototypes that include program logic and data mapping.

LIFE CYCLE SAVINGS

Using APS, your staff can easily extend prototypes into full production systems that support your most complex functional requirements. From your painted source, APS automatically

generates native COBOL code including DB/DC syntax and produces comprehensive system documentation. And, during maintenance, your staff can quickly and easily make enhancements at the productive painter level.

So unlike some productivity tools you may have seen, APS won't paint you into a corner. It simply helps you do your job better, and in a fraction of the time and cost.

To learn more about the integrated family of APS products, attend a free APS Seminar. Call us toll-free at 800-638-8703 or just send in the coupon below.

Please send me more information about APS.

Please include an APS Seminar Schedule.

Name _____

Title _____

Organization _____

Address _____

City _____ State _____ Zip _____

Phone _____ Date _____
MAIL TO: Marketing Services, SAGE Systems, Inc.
3200 Monroe Street
Rockville, MD 20852



SAGE SYSTEMS INC.

3200 Monroe Street • Rockville, MD 20852 • 301/231-8686 • 800-638-8703

APS supports batch and online requirements for DB2, IMS DB/DC, CICS, DL/I and VSAM production environments.

COMPUTER INDUSTRY

Burroughs denies reports that internal disputes led to layoffs

Firm blames facilities consolidation for cuts

By James Connolly

Detroit — Burroughs Corp. officials have denied reports that 140 employees at a Burroughs research facility in Boulder, Colo., were fired because of a dispute about whether their work met company compatibility requirements.

Meanwhile, a former Burroughs executive who spent more than 20 years with the company acknowledged that the communications software work done at the Boulder Advanced Systems Group had caused

political problems within Burroughs. However, that former employee, who asked not to be identified, theorized that the Boulder facility was closed because it was outdated and doing redundant work, not because of any dispute. The 140 technical staff workers were dismissed last month as part of a worldwide consolidation under which Burroughs laid off 900 workers (CW, Jan. 17).

"Those people were not fired," said Burroughs spokesman Irving Gelier. "It was just part of a consolidation of facilities. The company looked at the situation and decided that a large part of the work could be done elsewhere. They decided that the best way to do the research was

in other facilities. Boulder staff members were not going off on their own. In a modern \$5 billion corporation, you just do not have projects going off on their own."

The Boulder group, formed in 1983, reportedly was developing Unix-based systems software for 60M bit/sec. fiber-optic networks. According to Gelier, that same work is being done in other facilities, which will continue the research. Some of that Unix research is done at Burroughs facilities in Downingtown, Pa.; Lake Forest, Calif.; and Lexington, N.J.

The former Burroughs official, who acknowledged that the dispute existed and that the Boulder work was "a really controversial subject,"

reported that some managers from Boulder were transferred to Burroughs' Memorex Corp. subsidiary some two months ago.

That official also said the worldwide consolidations should have been done two years ago and that the move "will add profit to the bottom line."

Many of the 900 layoffs were targeted on Cumbernauld, Scotland, where 350 employees at a supermini-computer production facility will be laid off by June 30. Burroughs facilities in Carlsbad, Calif., and Coral Springs, Fla., will be closed, while there will be cutbacks at plants in Pasadena, Calif., and Rancho Bernardo, Calif.

Datapoint posts \$8.4 million quarterly loss

By James A. Martin

San Antonio — Datapoint Corp. reported a second-quarter loss of \$8.4 million for the period ended Jan. 26. That compares with a year-earlier second-quarter loss of \$28.9 million on a pro forma basis, or \$15.8 million when including results from Intologic Trace, Inc., the computer maintenance company spun off by Datapoint in July 1985.

The company said its annual stockholders meeting has been postponed pending a leveraged buyout proposed by an investor group led by Asher B. Edelman and Charles P. Stevenson Jr.

The investor group is in the process of arranging financing plans. The annual meeting, which had been scheduled for late February, will not commence until financing is completed.

This year's second-quarter revenue was \$79.8 million, including an extraordinary credit of \$3.5 million, compared with a loss of \$129.6 million one year earlier.

Equipment orders up about 50%

Second-quarter equipment orders were up about 50% compared with the first quarter, said Datapoint President and Chief Executive Officer Edward Gistaro.

In addition, the company divested itself of minority interest in Teknosem InfoSwitch Corp., according to Datapoint, which resulted in a net loss of \$1.1 million.

Separately, Intologic Trace reported net earnings of \$5 million for its second quarter ended Jan. 25, compared with pro forma earnings of \$4.5 million for the year earlier.

Revenue was \$39.6 million, compared with \$38.5 million in second-quarter 1985. Earnings per share were 32 cents per share for the most recent quarter and 24 cents per share for second quarter 1985, the company reported.

Figures for Intologic Trace in 1985 were determined on a pro forma basis to reflect changes that would have resulted from the operation of the company as an independent entity, a spokesman said.

Net/Alert has always widely-used network



Not so long ago, people called Net/Alert the Rolls-Royce of network performance monitors. They were right. Net/Alert was the most sophisticated, most widely respected system available — and the most expensive.

Yet knowledgeable network managers throughout the world chose Net/Alert. Because while the investment was big, the payback was bigger. And fast.

Now, thanks to our new technology, Net/Alert is even better. And more affordable.

New hardware, software. Lower prices.

New microprocessor and firmware technology has reduced Net/Alert prices to a level that can be justified in almost any network — even small ones. The latest release offers all the features that made Net/Alert the best and most widely used performance monitor — but at about half the price of earlier versions.

Net/Alert does more, and does it better, than any other performance monitor.

Now it's also the most affordable.

COMPUTER INDUSTRY



Autodesk, Inc. announced revenue for the fourth quarter ended Jan. 31 of \$10 million, compared with \$4.3 million a year earlier. Quarterly profits were \$2.2 million, or 32 cents per share, compared with \$723,000, or 13 cents per share, a year ago.

Floating Point Systems, Inc. reported revenue for the first quarter ended Jan. 31 of \$26.6 million, compared with \$27.7 million one year ago. Profits for the quarter were \$2.9 million, or 36 cents per share, compared with \$1.9 million, or 39 cents per share, in the period a year ago.

Computer & Communications Technology Corp. announced fourth-quarter revenue of \$13.8 million, compared with \$27.4 million in the comparable period a year ago. The company reported a net loss of \$10.3 million, or \$1.33 per share, compared with a net income of \$3.3 million, or 42 cents per share, in the like quarter a year ago.

Anacom, Inc. reported net income for the first quarter of fiscal 1986 of \$301,000, or 1 cent per share, on revenue of \$28.3 million. This compares with a loss of \$2.5 million, or 15 cents per share, on revenue of \$31.5 million in the same quarter of the previous year.

Recognition Equipment, Inc. announced revenue for the quarter ended Jan. 31 of \$54.1 million, compared

with \$37.9 million in the comparable period last year. Profits were \$1.4 million, or 14 cents per share, compared with \$2.1 million, or 17 cents per share, in the previous year.

Sanders Associates, Inc. reported revenue for the second quarter ended Jan. 24 of \$220 million, compared with \$230.1 million in the comparable period last year. Profits for the quarter were \$8.7 million, or 44 cents per share, compared with \$9.3 million, or 86 cents per share, a year earlier.

Nasua Corp. announced net income for the fourth quarter ended Dec. 31, of \$5.6 million, or \$1.17 per share, on revenue of \$169.1 million. This compares with net income of \$3.9 million, or 84 cents per share, on revenue of \$148.3 million in the like period a year ago.

been the best, most performance monitor.

Here's why more network managers have chosen Net/Alert.

More detailed application monitoring.

Networks exist to deliver applications to end users—reliably and efficiently. Your network may give good service on CICS and poor service on IMS. But how do you know? And when?

Net/Alert reports response time by application and even by transaction—in real time—down to the individual device level.

It's this degree of detail that makes Net/Alert such a valuable management tool. (One of our customers tracks more than 400 different transactions.)

No other performance monitor can give such richly detailed facts. Some don't monitor applications or transactions at all.

Strikingly clear color graphics.

Net/Alert's easy-to-grasp color screens alert operators instantly to status and performance problems. You can see the network's service level at a glance. Overall. Or by application or transaction type. And you can zero in on groups of lines, individual lines, control units, and terminals.

You can spot problems quickly. And fix them fast.

No other performance monitor is so sophisticated, yet so easy to use and understand.

More reports. More useful information.

Net/Alert's reports provide incomparable detail that helps you analyze trends and maximize network resources. To track response time,

end-user availability, line utilization, and terminal utilization. All by application or transaction.

Many of our more than 250 reports and over 100 graphs were designed with the help of our customers. So we know they meet real-world needs.

And you can call up any report with a few keystrokes. Only Net/Alert provides so much, so easily.

More practical, more flexible database.

Net/Alert's on-line database is under your control, independent of the host computer. It builds historical files for today, yesterday, this week, this month, this year. On boundary lines, trunk lines, transmission groups, control devices.

For off-line planning and analysis. Net/Alert offers an unmatched array of options. You can dial into the database from a PC. Transfer files on-line to the host, or by tape.

Here's why Net/Alert is an even better choice today.

Many more features.

Most performance monitors are limited to leased-line networks. But Net/Alert can also handle dial-up and trunk networks X.25. Speeds up to 64kb. Over 50 protocols. For IBM, Sperry, Compaq, Burroughs, ICL, Honeywell, Digital, and others.

No other performance monitor has all these features. Some have hardly any.

Dial-up security and monitoring.

As dial-up networks grow, they become harder to secure. And harder to control. Now you can add Net/Guard—security and monitoring of your dial-up network—to your

Net/Alert performance monitor.

No other performance monitor has anything like it.

Monitoring backbone networks.

More and more regional networks are being linked together with high-speed trunk lines. They, too, need to be monitored. And we can now add Trunk/Alert—monitoring of your backbone network—to your Net/Alert performance monitor.

No other performance monitor can offer anything like it.

Control other network tools.

Net/Alert workstations can now control other network tools: matrix switches, modems and mux monitors, and host software.

No other performance monitor can match that.

Net/Alert.

Still the standard.

Some say their performance monitors are "just as good as Net/Alert." They're not.

Net/Alert has always been the standard of excellence in network performance monitors. It is even better today. And with its new features and affordable pricing, there's no reason to settle for less.

Call today: 609-778-7000. Ext. 319
Avant-Garde Computing, Inc.
800 Commerce Parkway
Mt. Laurel, NJ 08054-2227



Because networks must be managed.

Vendors help stack the DEC

From page 114

Everyone, it seems, wants a piece of DEC.

One of the more interesting members of that group is AST Research, Inc., the Irvington, N.Y.-based microcomputer add-on board. AST last week snapped up DEC's move add-on board Camtison Corp. (see story page 112). In a sense, AST's move into the DEC world mirrors the principle upon which the firm was founded in a Santa Ana, Calif., garage in 1980.

Its three founders, two from Hong Kong and one from Pakistan, bet the business on the call that the IBM Personal Computer would be the place to go. technological enhancement products and all the subsequent layers of OEMs and value adders that would make the business boom.

Now, in a smaller but more sophisticated way, AST says it feels the same about DEC's lower-end products. "We like to complement the strategy of the major players," AST cofounder Safi Qureshey (the "S" in AST) explains. "Connectivity is not just a PC issue or a minicomputer issue. There is always a need to con-

Computer industry section begins on page 114.

nect."

Qureshey says he feels that AST, via Camtison, can become a major player in the DEC add-on business, where Emulex Corp. has been the dominant firm.

Emulex has had more than its share of patent infringement run-ins with DEC over the past year, but Qureshey predicts that DEC may be more willing to nurture its relationships with add-on companies now.

It's the old rule of thumb. When sales are slow, a company tends to guard jealously its business against third-party sales channels, clone or add-on vendors, even its own customers—witness Sperry Corp.'s recent unbundling of its mainframe operating system software. But when business is good, it is well worth sacrificing a few current sales to cultivate a healthy value-added aftermarket.

That is where Qureshey says he feels DEC is quickly headed, and his enthusiasm is worth noting. Remember, AST about a year ago was peripheral line because it felt IBM had no clear niche in mind for the ill-fated box.

Such calls have enabled AST to increase its revenue tenfold in three years, and AST's presence on the DEC bandwagon is not a bad omen.

Industry watchers may be quick to interpret Zenith Data Systems, Inc.'s victory over IBM and AT&T for the Internal Revenue Service's laptop contract as David triumphing over Goliath. But in reality, it was Zenith that brought a real, proven system to the table—as well as a strong track record in government accounts. In that context, it was not such a great surprise that Zenith won out over a still-unannounced IBM product—despite what other computer trade publications may have erroneously reported.

COMPUTER INDUSTRY

U.S. government to revise industrial classification codes

Change reflects moves in computer industry

By Mitch Betts

WASHINGTON, D.C. — The U.S. Office of Management and Budget (OMB) recently proposed plans to revise the government's Standard Industrial Classification (SIC) system to reflect changes in the computer industry.

The widely used, four-digit SIC codes have not been revised since 1977. They lump all sorts of computer statistics under broad categories, consequently masking specific industry trends.

The revised codes, slated to take effect in 1987, would create new, separate industry codes for many segments of the computer industry giving them greater visibility in government statistics.

The OMB said a technical panel recommended that the codes be updated by giving bigger industries their own codes and merging smaller ones into other categories. OMB said it is seeking public comments on the proposed revisions until April 15.

Manufacturers of electronic computing equipment (now 3573) would be broken up into five new categories: (3571), computer storage devices; (3572), computer terminals (3575), recording media (3695) and

other computer peripheral equipment (3577).

Other changes recommended by the panel include the following:

- Computer programming and software services (3732) would be split into three categories: prepackaged computer software (3663), computer-integrated system design (3733) and custom computer programming services (3731).

- Data processing services (3734) would be split into three categories: electronic information retrieval services (3735), computer facilities management services (3736) and computer processing and data preparation services (3734).

- Radio and telephone services

would be split, with telecommunications companies getting an separate SIC code (4912). Communications equipment would be included in electronic parts and equipment (5065) rather than in electrical apparatus. Modems would move from radio/television equipment to telephone/telegraph equipment (3661).

- Other computer-related services (3739) would be split into three categories: computer rental and leasing (3737), computer maintenance and repair (3738) and other computer-related services (3739).

- Computer and software stores would get their own SIC code (5734) instead of being classified along with radio and television stores.

INDUSTRY NOTES

Tandon appeals ITC decision

Tandon Corp. will appeal the International Trade Commission's (ITC) recent ruling that Mitsubishi Electric Corp. did not infringe upon Tandon's floppy-disk-drive patent.

The ITC unanimously rejected the Tandon claim, noting that Mitsubishi's floppy-drive technology is fundamentally different from that covered by the Tandon patent. ■

Corvus Systems, Inc., struggling from financial woes, sold its Onyx line of 8-bit and 16-bit multilayer systems to Megalogic Inc., the U.S. subsidiary of Microelectronics Aplicada, S.A. Megalogic claims that it has manufactured Onyx products in Mexico for two years. Micrologics will also distribute Corvus local-area networks and micro peripherals in Mexico. Terms were not disclosed. ■

Lotus Development Corp. will buy back 10% of its common stock, a move that could cost the company as much as \$36.3 million. Lotus said it acted because it believes the stock is currently undervalued, but at least one analyst, Broadview Associates' Harvey Poppel, believes that the move may indicate Lotus is preparing to make another corporate acquisition. ■

Former Schlumberger Ltd. Chief Executive Officer Pierre Schlumberger died in Paris at age 71. ■

A U.S. Bankruptcy Court approved the reorganization plan of Computer Devices, Inc. ■

Sterling Software, Inc. completed the sale of its insurance systems unit to Policy Management Systems Corp., the first of several divestitures Sterling said it will make to pay the \$100 million debt incurred in the acquisition of Informatics General Corp. last year. ■

Introducing Lasography.

About twenty-five years ago Xerox introduced the first plain paper copier.

An achievement that brought xerography into almost every office.

Since then, Xerox has been applying the power of laser technology in high speed computer printing systems. Systems that produce superb documents of unsurpassed quality. Quickly, quietly and cost effectively.

Now, through this process which we've named Lasography, Xerox has come up with a revolutionary product that lets smaller offices and work groups enjoy these benefits, too.

Introducing the Xerox 4045 Laser Copier Printer.

It's the desktop copier/laser printer with a totally unique dual personality.

For one thing, it's a sophisticated laser printer. It can print up to ten pages a minute. Which is ten times faster than standard office printers.

And while other desktop printers serve primarily one workstation at a time, the Xerox 4045 Laser CP is designed to accommodate four.

Not only that, but with the Laser CPs graphics capabilities you can merge the forms, logos, texts and signatures you

want printed and produce documents that anyone would be proud of.

But the Laser CP also doubles as a high quality convenience copier.

The Xerox 4045 Laser CP is only one example of what Lasography has to offer your office, remote or distributed data processing environments.

Because Xerox is already planning ways to absorb Lasography toward an even wider selection of products.

All of which will put your office exactly where you want it to be.

Light years ahead. Call 1-800-TEAM-XRX, ext. 179 for information and demonstration.

**The Xerox
4045 Laser CP.
A desktop laser printer
that's also a copier.**

Please send me more information on Xerox
Lasography. Send me a copy of the
Xerox 4045 Laser CP brochure.
Xerox Corporation, P.O. Box 34, Rochester, NY 14682

NAME	TITLE
COMPANY	
ADDRESS	CITY
PHONE	FAX

1-800-TEAM-XRX, ext. 179
1-800-423-1774, ext. 179
0103/86

COMPUTER INDUSTRY

Michigan loses \$1.5 million as Down Under firm goes under

State's investment 25% of Attache's capital

By Edward Warner
Computerworld News Service

ANN ARBOR, Mich. — The latest victim of the microcomputer software shakeout is an unlikely venture capitalist: the state of Michigan, which recently lost an estimated \$1.5 million it had invested in the Australian personal computer software publisher Attache. Attache has gone out of business, taking with it an estimated total of \$6 million in investors' money.

While David Turner, a senior analyst with the Michigan Department of Treasury, would only say the state had "considerable exposure" in the company, one of the private investors in Attache's U.S. operation pegged the state's loss at one-fourth of \$6 million. A U.S. capitalization—Michigan's Venture Capital Fund, a state agency responsible for encouraging high-tech development in Michigan, had provided "in the ballpark of 25%" of the investments in Attache with two rounds of financing, Turner acknowledged.

The state's money came from a \$250 million pool of venture capital that is part of the state's \$1.3 billion science and technology budget, explained a Venture Capital Fund director, Michael Finn. Finn called the loss "a drop in the bucket," and said it was not the Venture Capital Fund's first loss.

"We've had our losses, and we'll

continue investing," he said. "In any venture capital program, you lose three out of 10 investments."

One of the lead investors in Attache's U.S. operation, Ian Bund, meanwhile, estimated that the U.S. operation's bankruptcy represents a total loss to investors of between \$4 million and \$6 million, depending on how much has been earned from the sale of the U.S. operation's assets.

In the U.S., Attache marketed an accounting program for the IBM Personal Computer called 2X2 Version Four. The software was one of the

first packages to run under Microsoft Corp.'s Windows.

Bund, a partner in MBW Management of Ann Arbor, said Attache was unable to get widespread distribution for its software in the U.S. and closed the doors of its U.S. operation here about 18 months ago. MBW Management, an investment management fund, was one of the major investors in Attache's U.S. venture, Bund added.

According to a clerk at the U.S. Bankruptcy Court in Detroit, Attache's U.S. operation has not yet filed for liquidation or for protection from

creditors under U.S. bankruptcy laws. The clerk, however, noted that no law requires a bankrupt firm to do so, although its creditors may petition the court to require such action.

To regain Attache's file information, a bankruptcy filing is federal, at least three or more creditors must petition the court and put up a bond. So far, Bund said, none of the creditors appear prepared to put together the bond money.

Instead, investors are willing to pursue less formal means to recoup their losses, according to Bund, and they were encouraged by the "orderly wind-down in business" that occurred at Attache's U.S. operation prior to its liquidation, he added.

Computer industry section begins on page 114.

Fortune Systems posts yearly loss

BELMONT, Calif. — Fortune Systems Corp. last week announced its second straight yearly loss, losing \$23.5 million, or \$1.12 per share, in the year ended Dec. 31, 1985.

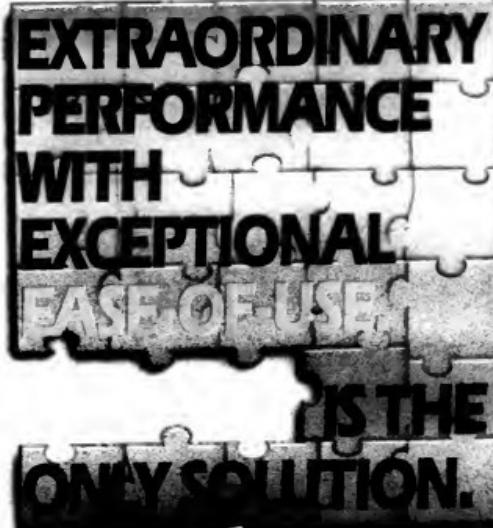
In 1984, the vendor of Unix-based multiuser office systems lost \$21.9 million, or \$1.02 per share. Annual revenue fell from \$70.2 million in 1984 to \$47.5 million.

Fourth-quarter revenue was \$14.9 million, down from \$18 million a year earlier, but was an 82% increase over third-quarter sales. Fortune Systems posted a fourth-quarter loss of \$15.6 million, or 74 cents per share, including approximately \$14 million in non-recurring charges for downsizing the company. Charges included severance pay for 100 employees during November 1985 and January 1986 and write-downs on inventories, receivables, fixed assets and other assets. Since early 1985, Fortune has slashed its work force by nearly 50% to 275 employees.

In the fourth quarter of 1984, Fortune Systems posted a loss of \$14.9 million, or 70 cents per share, which included significant write-downs.

"The microcomputer industry turned in 1985 to teach everyone that revenue and profitability assumptions needed to be rethought," according to President and Chief Executive Officer James S. Campbell.

— Clinton Whited



Achieving extraordinary performance while also offering exceptional ease-of-use has been a traditional DBMS puzzle—until now. Introducing SEED II, the integrated interface that makes SEED DBMS the fastest, friendliest, high performance DBMS available for VAX systems today.

SEED II is a powerful, user-friendly, 4th generation language environment that builds on the extraordinary power of the entity/relationship data model of SEED DBMS. Using artificial-intelligence technology, SEED II provides a truly comprehensive environment

for both application development and decision support for your VAX system.

SEED DBMS has built its reputation on speed, and now, with SEED II, it is as fast as ever and even easier to use. SEED combines the simplicity of the relational view with the power of a network structure, giving you greater performance and even more exceptional ease-of-use. No other DBMS offers both.

If you're puzzling over which DBMS software to choose, look for SEED...it's the only solution.

For more information about SEED, call today! (609) 628-9466.

(In Virginia, call (703) 645-0944.)

SEED
SOFTWARE CORPORATION
2121 Eisenhower Avenue • Alexandria, VA 22314
AN AFFILIATE OF MANTECH INTERNATIONAL CORPORATION

COMPUTER INDUSTRY

Siemens AG, Sequent announce \$50 million agreement

West German firm gets product rights

By Donna Raimondi

BEAVERTON, Ore. — Sequent Computer Systems, Inc. last week announced a \$50 million OEM agreement with the West German firm Siemens AG.

Siemens, a \$20 billion electronics company that makes power systems, factory automation equipment and various transaction processing and office automation systems, has both purchased Sequent products and acquired manufacturing rights to Sequent products. The two companies will exchange information and technologies,

said Sequent's Chief Operating Officer Scott Gibson, but he would not comment on the nature of the exchange.

The West German company will buy the Sequent Balance 8000 parallel processing system, which includes from two to 12 32-bit microprocessors. According to Gibson, Sequent's recently released Balance 21000 system, which

incorporates up to 30 processors, is not involved in the deal.

The agreement will boost the popularity and acceptance of parallel processing architecture, Gibson said. "When a 120 billion company decides to use parallel processing, that's news," he added. Siemens, which has not used parallel processing

in its systems before, is said to be planning to use the architecture for OA and transaction processing applications. At present, most parallel processing systems are used in scientific — computing.

The move gives Sequent the credibility that it has sought since its inception, said Omri Serlin, an analyst at Item International, a research and consulting firm in Los Altos, Calif. "They have had on-again/off-again sales for the most part, although their goal was always to become a major OEM supplier," Serlin said of the 3-year-old company. The agreement should solidify Sequent's lead in the parallel processing field against competitors like Flexible Computer Corp., he added.

Sequent's hardware and technology will be incorporated into new products from Siemens to be announced later, a Sequent spokeswoman said. The two companies have already been working on joint product development for several months and said that relationship will continue.

Prime merges departments

NATICK, Mass. — Consolidating two departments into one, Prime Computer, Inc. last week announced the formation of a systems marketing and development department.

The department combines the product marketing department and the research and development organization.

Stephen Kiely, former corporate vice-president of R&D, will head the new department. The change comes after the resignation of nine-year Prime veteran Ian R. G. Edmonds, corporate vice-president of systems and product marketing, who left to pursue outside interests.

New vice-presidents

President and Chief Executive Officer Joe M. Henson also said that the new systems and marketing development organization will have two new vice-presidents.

Paul Jones, former senior director of I/O and communications, has been named vice-president of hardware development and will report to Kiely.

Ken Roy, former senior director of central systems, has been named vice-president of central systems and will report to Jones.

— Stanley Gibson

WHAT DO YOU EXPECT FOR \$299?



Introducing The ANT™ terminal. It's the lowest priced alpha-numeric terminal ever. It's packed with features. Loaded with value. But best of all, you'll get the incomparable quality and performance you expect from CIE Terminals. Just call us at 1-800-CIETANT and order yours. That's the only way you can get The ANT. In fact, our toll-free number is the only thing cheaper than our \$299 price tag.

CIE TERMINALS
Craftsmanship from CIE Tech

1-800-CIET ANT

The ANT is a trademark of CIE Terminals

©1986 CIE Terminals Inc.

COMPUTER INDUSTRY



EXECUTIVE CORNER

Caddex Corp. has announced the appointment of Hugo E. Cannizaro as president and chief executive officer. Alan A. Andersen, a founder and former chairman, has been promoted to chairman of the board. Cannizaro's previous position was with Prime Computer, Inc. as vice-president of Western Operations.

CCX Network, Inc. has announced the appointment of Phil Carter as president. Prior to joining CCX, Carter had been with IBM. His most recent position there was as division director of Field Administration Operations at Montvale, N.J.

BKW Systems, Inc. announced the appointment of Eugene J. White as chairman and chief executive officer.

Alfred J. Fischers Jr., founder and former chairman, will now assume the position of president and chief operating officer.

Jerry Del Signore has been appointed to vice-president, Corporate Development and Security, Pacific Information Systems, Inc., where he will specialize in mergers and acquisitions. Previously, Del Signore directed the growth plans of AIM International and Computer Sciences Corp.

Siemens Components, Inc. has announced the appointment of Robert E. Caldwell as senior vice-president and general manager of the newly created semiconductor group. Caldwell—who before coming to Siemens had been senior vice-president, engineering and technology, with Mostek, Inc. of Carrollton, Texas—will have the responsibility of unifying and building the semiconductor group through its three operating units.

John H. Curtis has been named executive vice-president and chief operating officer of Stratus Computer. Inc. Curtis joined Stratus in 1980 and served most recently as the company's vice-president of international sales. Previously he served Stratus as vice-president of finance and chief financial officer.

David V. Radlinski has been named to the position of vice-president of finance and chief financial officer for Printtronix, Inc. Radlinski joined Printtronix in 1984 as corporate controller.

Tandy Corp. has announced the appointment of Richard L. Ramsey to vice-president controller. Most recently Ramsey was vice-president, North American Manufacturing, at Tandy.

Ashton-Tate has announced the appointment of David Kasnia as vice-president, controller.

Prime Computer, Inc. has announced the appointment of Brian F. Crossen to vice-president of workstation programs within the company's computer-assisted design and manufacturing and workstations/terminals group. In this newly created position, Crossen will be responsible for

developing and marketing a variety of workstations and terminals.

AT&T Bell Laboratories has announced the following appointments: Joseph W. Tinko has been elected vice-president, AT&T Architecture; Lee S. Tuck has been named vice-president, Project Realization Planning and Engineering; and William B. Smith has been appointed executive director, Network Analysis and Technology.

Gandalf Technologies, Inc. has announced the following changes: Gordon W. Gow, formerly president of Gandalf Systems Group, becomes vice-president of new business development, a new position. He will be responsible for the operation of a business that Gandalf plans to operate separately from its principal data

communications business.

Brian R. Hedges, vice-president for finance and treasurer in addition to his present responsibilities for the company's treasury, public financial reporting and investor relations, will be responsible for corporate planning and acquisitions.

James M. Bailey, formerly vice-president of manufacturing, becomes vice-president of operations with responsibility, in addition to worldwide manufacturing, for computer operations and communications, technical communications and operational control and administration of Gandalf's subsidiaries.

The American Federation of Information Processing Societies has announced the appointment of John Clement as director of governmental activities, a newly created position.

Memorex Corp. announced the appointment of John Douglas to the position of vice-president and general manager of its communications division.

RCA Corp. announced the appointment of Eugene M. Stockton as division vice-president and general manager of RCA's Automated Systems Division. The Automated Systems operation designs and manufactures a wide range of automatic test equipment, vehicle test equipment and command and control systems.

Uccel Corp. announced the appointment of Michael G. Coeks as corporate vice-president. Coeks serves as vice-president and general manager of Uccel's International Software division, with headquarters in London.

BRING BUGS TO LIGHT



WITH REALIA

The fastest micro COOL.
The brightest interactive source debugger.
8088 instruction COOL compatibility.
Supersupport.
Try it for free, if you qualify.

10 South Riverside Plaza
Chicago, IL 60606
Phone: 312/645-0447
Fax: 312/645-0447

ON APRIL 16, WE FOCUS ON MICROCOMPUTING.

If you're dealing in that enormous segment of the market known as micros, the April 16 issue of Computerworld Focus gives you the opportunity to reach the decision makers who buy micro products in bulk. The MIS/DP professionals. They're the ones impacted most by the ever-expanding popularity of microcomputers. The ones with responsibilities for coordinating new and existing micros into their overall information systems strategy.

They'll find the help they need in April's Computerworld Focus. Strategies for the present and the future. State-of-the-art products and technologies. Security. Vertical applications. Software. Plus networking and communications.

Then we'll zero in on micro storage.

April's special section takes a good, hard look at storage. We'll compare floppies to hard disks, 3-1/2" to 5-1/4" disks, and address issues of storage efficiency. So, in the end, our readers can make intelligent choices for their companies' applications.

Reach the people you really want.

The people we'll reach with Computerworld Focus are the people you want most: 199,000 MIS/DP professionals who subscribe to Computerworld. Plus thousands of pass-along readers. Plus attendees at Comdex/Spring.

So, while your audience is focusing on their problems, reach them with your solution. With an ad in April's micro issue of Computerworld Focus.

But hurry, closing is March 7.

For more information, contact Ed Marecki, Vice President/Sales, Computerworld Focus, 375 Cochituate Rd., Framingham, MA 01701, (617) 879-0700. Or call your local Computerworld sales representative.

Issue: April 16 - Closing: March 7

COMPUTERWORLD FOCUS

We put the hottest issues of the day in focus

BOSTON

New York
San Francisco

Atlanta
Los Angeles

Chicago



BUY - SELL - SWAP

IBM SYSTEMS, PERIPHERALS, UPGRADES

SYSTEM 36 SERIES/1 SYSTEM 38 SYSTEM 34 PC, XT, AT 4300/3080 DISPLAYWRITERS DATAMASTERS S/23

BUY, SELL, LEASE 612/894-2200 BUY, SELL, LEASE
ALSO: FINANCE & OPERATING LEASES FOR ALL SYSTEMS & PERIPHERALS.

**Valley Computer
& Financial, Inc.**

12225 Nicollet Avenue, Burnsville, MN 55337



Don't Sweat It!

Call These Professionals for ALL Your IBM®
Buy / Sell / Leasing Needs

SYSTEMS

800-433-4148

PERIPHERALS



**DANA
MARKETING, INC.**

Callouts 213 212-3111 Connecticut 203 359-8040 Texas 214 437-9018

BUY/SELL/TRADE/BROKER

IBM □ DG □ DEC

Call today

(305) 392-2005

- PARTS
- SYSTEMS
- PERIPHERALS
- REUSED
- SURPLUS
- AT DISCOUNT PRICES



thomas business systems, inc.
4001 ONE CIRCLE • UNIT 11 • BOCA RATON, FL 33481

CMI

A LEADING SPECIALIST
SERVING THE DATA PROCESSING &
TELECOMMUNICATIONS INDUSTRY

Buy • Sell • Lease

**3081, 3083,
3084**

For Sale
or Lease

**3380 AA4
3380 B4**

Save over 60%
on Short Term
Leases

CMI

A Torchmark Company

2900 Telegraph Rd., P.O. Box 2026
Bloomfield Hills, MI 48303-2026
(313) 456-9000

(313) 456-0000

Member ASCD

Member CDLA

Why

WHY SHOULD YOU LEASE?
WHY SHOULD YOU BUY?
WHY SHOULD YOU SELL?
WHY SHOULD YOU TRADE?
WHY SHOULD YOU UPGRADE?

WHEN YOU WANT
ANSWERS,

CALL: 800-238-6405

IN TN: 901-372-2622

IN NC: 919-884-0879

- IN BUY - BILL - LEASE

34 - 36 - 38 - SERIES 1 - 4321-4321
ALL PERSONAL & BUSINESS
ALL UPGRADERS

DEPT. 600 - DATA COMMUNICATIONS CONSULTANTS



COMPUTER BROKERS INC.
2978 SHELBY ST.
MEMPHIS, TN 38134

"SINCE 1974"



1-800-IBM-USED
(171) 591-1200

IBM is a registered trademark of International Business Machines Corporation. Licensee is Associate or not affiliated with IBM.
IF IBM MAKES IT,
WE CAN SAVE YOU MONEY

**Series/1
System/34
System/36
System/38
4300 & Up**

- Top Savings
- Quick Delivery
- Short and Long-Term Leases
- All Models & Peripherals
- New & Used

Marshall Lewis

6 Associates, Inc.

1385 Warner Ave., Suite A

Tustin, CA 92680

P.O. Box 2010, Tustin, CA 92681

ML

BUY SELL SWAP

BUY SELL SWAP

BUY • SELL • LEASE • TRADE

800-423-8436

IN TEXAS
214-681-7871

ALL IBM EQUIPMENT

THE COMPUTER LEASING HOT LINE: **800-243-5307**

(In CT. call 203-661-4200)

You don't have to wait. Call us now for the best rates going on IBM systems... from 4341's to 3090's and everything in between. Ask for Thomas McShane.

Randolph

Randolph Computer Corporation
537 Steamboat Road, Greenwich, CT 06830

IBM UNIT RECORD EQUIPMENT
DISK PACKS DATA MODULES MAG TAPE DISKETTES



SALE OR LEASE

IBM UNIT RECORD MACHINES NEW & USED
026-029-082-083-084
085-087-088-129-514
519-548-557-188

DISK PACKS—DATA MODULES
2316—(330611)—(335611)—3348(70)
MAG. TAPE—DISKETTES

Every item Guaranteed

Highest Prices Paid for Used Packs & Modules

THOMAS COMPUTER CORPORATION
1523 W. Howard St.
IL 60648
800 827-3900

IBM BUY • SELL • LEASE



Series 1
Series 2
Series 3

36
38

4300

11 00 51A
E55 2447

116-047-8888

BUY SELL SWAP

BONUS.



Get a bonus with your subscription — 10 issues of COMPUTERWORLD FOCUS. Each new issue for 1986 will deal in depth with such topics as Communications, Microcomputing, Manufacturing and more. To subscribe, complete the order form and mail in this postage paid envelope. Or call 1-800-544-3712* for faster service.

* In PA call collect 215 768-0388

COMPUTERWORLD.
Keeping Up With Today. Anticipating Tomorrow.

The Bulletin Board

PRIME

LARGE SELECTION OF USED PRIME COMPUTER SYSTEMS
Performance and availability
guaranteed. Call or write:
2601 EAST CAMPBELL AVE
PHOENIX, ARIZONA 85016
ASH FOR DON OR MATT

Tel. for details, largest and most
comprehensive supplier of third party
peripherals and software.

INFO & BILL - 602-947-9811
FAX - 602-947-9812
MAILING ADDRESS: 2601 E.
CAMPBELL AVE., PHOENIX,
ARIZONA 85016

DEC

FIRST ON DEC
FOR SALE

11730 - XA-EZ
11730 - XA-EX
DESKPAK-4A
DESKPAK-5A
MICROPAK II
PAK-EZ
PAK-EA
PAK-EX
VTPAK
VTPAK-EX
VTPAK-5A

\$15,000
\$15,000
\$2,000
\$2,000
\$1,000
\$1,000
\$1,000
\$1,000
\$1,000
\$1,000

42,000
40,000
40,000
40,000
40,000
40,000
40,000
40,000
40,000
40,000

1,000
1,000
1,000

WE ALSO BUY IBM HARDWARE

CALL

602-947-9811

INFO & BILL

VOX INC.

7405 SOUTH 20TH AVE.
LOUISVILLE, CO 80027

DEC SALE OR LEASE

VAX

Disk Tape

Terminals

WANT TO BUY

VAX 780

FOR SALE

VAX 11/785

Call BILL MILLER

Vergo Company

(313) 254-2850

DEC WINTER WONDERS

11730 - XA-EZ

11730 - XA-EX

DL11-W

DL11-X

HS203X-5A

MS6200-RA

MS6200-RA

MS6200-RA

MS7040-5A

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

COMPUTERWORLD

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

**LIFE/70
LIFECOMM
TO \$65,000
1-800-423-5383**

Our insurance specialists have over 50 years of life insurance data processing experience. Our clients have openings throughout the U.S. for professionals with life insurance background. The demand for LIFE/70 or LIFECOMM experience has never been greater. Call or send your resume to:

**ROBERT SHIELDS
& ASSOCIATES**
P.O. Box 1000, Dept. I,
Houston, Texas 77258-0056
In Texas call: 713/488-7961

PROGRAMMER/ANALYST

CDS is a computer systems and consulting firm in Irving, Texas which provides software development, consulting services to our manufacturing clients worldwide. Our staff of over 100 people are highly skilled in the use of computers and the software we are industry leaders. We offer the following opportunities:

- INCLUDES
- COMPUTER LOGIC
- MATERIALS ANALYSIS
- COMPUTER SYSTEMS
- HIGH LEVEL LANGUAGE
- DATA BASE CONTROL

If you do not have one of these skills we are currently seeking, but have a strong C background, we have challenging opportunities. Call us today.

**COMPUTER
CONSULTING GROUP**
3700 Forest Drive, Suite 405
Columbia, SC 29204
1-800-222-1273 or 803-739-1994
ATTN: Arlene Dubois or Diane Williams

**SYSTEMS ANALYST
PROGRAMMER/ANALYST**

Pearl County Medical Systems, a Blue Shield affiliated company, is seeking a Systems Analyst/Programmer/Analyst. These two positions are a part of a team of professionals who will design and implement PMS in 100 facilities and will work closely with the Blue Cross and Blue Shield of America.

A college degree is required, but not mandatory. An appropriate experience. Previous experience with Blue Cross and Blue Shield is a plus. Experience in COBOL, programming languages, including RACT, and working knowledge of mainframe and mini-computer systems, basic data base management, and problem solving techniques.

We offer excellent salaries, excellent benefits, and a pleasant working environment. Please submit your resume, in confidence, to:

1114 Broadway Plaza
Tampa, Florida 33602
APACHE

**DATA SECURITY
ADMINISTRATOR****SOUTHERN CALIFORNIA**

Glenelg Federal Savings and Loan Association, the principal operating subsidiary of GLENFED, Inc., is a rapidly growing financial institution with assets in excess of \$1.5 billion dollars. This nation's fifth largest savings and loan, it has nearly 300 branch offices in California and Florida.

Glenelg Federal's information systems are expanding to accommodate its growth and to support its needs as a regional data security administrator. The position requires both strong RACT and TPS. Technical responsibilities should include maintenance of data security systems, data security systems or applications programming, data communication environment. In addition to RACT administration, other responsibilities include system planning, system analysis, disaster recovery, data communication and multi-end-user capacity. Excellent interpersonal communication skills are also required.

We offer a competitive salary and benefit package. For immediate consideration, please send your résumé to:

**GLENDALE
FEDERAL**
P.O. Box 1799
Glenelg, MD 21058
Attn: Professional Recruiting
An Equal Opportunity Employer

When you don't have time to find the job you want

Searching for a better job can be a full time job. That's why so many data processors, who want to make a change, don't. Or worse, they take the next job offer that comes along.

If you can relate to this problem, Robert Half-Data Processing may be just perfect for you.

We're sensitive to the problem of the data processing professional, who wants to be fair to the present employer, and at the same time finds it necessary for career advancement to look for another job. Robert Half has been successful at discreetly locating the right career positions for data processors—ever since the computer revolution began.

We can help you just as we've helped thousands of other professionals for almost 40 years.

If you must make a change, but can't spare the time for an interview during work hours, just call one of our 100 offices on three continents during a regular work day. Briefly explain your problem to one of our placement professionals, and we'll set up an in-depth phone interview at your convenience—after hours or on the weekend. If it's convenient for you to meet with us, so much the better—we'll arrange the interview.

And if you don't have a current resume, we'll discuss all the pertinent facts with you and compile them for presentation to suitable employers.

Please understand this: Our service is 100% free to you. And, equally as important, we're success oriented. This means our clients only pay our fees when they hire through us. This makes us better. *A lot better.*

So, if you're interested in finding a better data processing job, call one of our nearby offices. A few moments of your time now, may be the beginning of a new and brighter future.

**ROBERT HALF
DATA PROCESSING**

© 1986 Robert Half International Inc.
(Offices independent, owned and operated)

Data Processing**NETWORK PLANNER/
ANALYST**

Qualified individual needed to plan, install and maintain X.25 networks in established short-haul and long-haul areas of MCPIPS. X.25, DCA 325 essential. Knowledge of PRI, SLC, SLC II, SLC III, Routers, and X.25 gateways, BSCS or BSCS or the equivalent plus a minimum of 6 years related experience. We offer a competitive salary, 100% company paid benefits and a convenient Northwest Atlanta location. To apply send resume to:

Linda Kobil
Personnel Representative

**INSTITUTE OF
NUCLEAR POWER
OPERATIONS**
1100 Circle 75 Parkway
Suite 1000
Atlanta, GA 30338

INPO
Equal Opportunity Employer M/F

IBM Series 1**Career Challenges At
Various Locations In U.S.**

SDA provides major corporations with leading-edge DR technology in the fields of automotive, manufacturing, communications, energy, and government. Competitive experience has created growth-charged opportunities for experienced professionals with a background in EDI/EDML, RPS, CP or IBM/PCC, and AS/400.

We offer top salaries and benefits, plus the career potential of joining one of America's most strongly established consulting organizations. To learn more about these exciting opportunities, CALL COLLECT or send your resume to:

Patricia Motola
Special Projects Administrator
(212) 741-5200

**SDA SOFTWARE DESIGN
ASSOCIATES, INC.** 

71 Fifth Ave., New York, NY 10003
An Equal Opportunity Employer M/F/H/V
10 Offices in • Arizona • California • Connecticut • Delaware
• Florida • Georgia • Illinois • Massachusetts • New Jersey • New York
• Ohio • Pennsylvania • Texas • London, UK

POSITION ANNOUNCEMENTS

McDONNELL DOUGLAS
INFORMATION SYSTEMS GROUP

Outstanding Opportunities for Qualified CAD/CAM Programmers

McDonnell Douglas Information Systems Group, one of the largest and fastest growing commercial computer services companies in the country, seeks CAD/CAM programmers and specialists to develop and support our UNIGRAPHICS, UHISOLID, and UNIPCG product lines.

To qualify you must have experience on DEC, IBM 300 Series, or UNIVAC CPU's with FORTRAN computer language. Technical degree required for all positions. Positions are available at various levels of experience.

GEOMETRIC MODELING DEVELOPMENT

ELECTRICAL CAD DEVELOPMENT

COMPUTER AIDED MANUFACTURING DEVELOPMENT

COMPUTER GRAPHICS DEVELOPMENT

SYSTEMS PROGRAMMER/ ANALYST

TELECOMMUNICATIONS DEVELOPMENT

Interested individuals should send resume to:

**MCDONNELL DOUGLAS
INFORMATION SYSTEMS GROUP**

Attn: Ruth King, Dept. CC

5701 Katella Avenue, Cypress, CA 90630

Equal Opportunity Employer M/F

OUR
FINEST
PRODUCT
IS
OUR
PEOPLE

TELECOMMUNICATIONS ANALYST

Safeway Stores Incorporated has immediate openings for a Lead Telecom Analyst and a Staff Specialist. Successful candidates will possess 8 to 12 years in Data Processing with heavy telecommunication experience, particularly with IBM SNA Products. Tandem experience is desirable. BS/BA preferred.

RESPONSIBILITIES

- **Lead Analyst**—Design and implement complex systems/telecommunications networks. Selection and installation planning for networked systems.
- **Staff Specialist**—Evaluate data communication hardware and software products with respect to system integration considerations/constraints/benefits within an existing data communication network.

Safeway Stores Inc. maintains a state-of-the-art working environment while offering personal development and excellent pay. We invite you to explore career opportunities with us by sending your resume and salary history to: (No Agencies or phone calls, please.)

Safeway Stores Inc.
Technical Recruiting
Dept. TC-7
457 Roland Way
Oakland, CA 94621

An Equal Opportunity and Affirmative Action Employer M/F H



Sales Support Representative

UCCEL means excellence from top products to the bottom line.

Some companies are technology driven. Others are market-driven. At UCCEL these forces are one and the same. We've created our own markets, and become one of the nation's leading independent suppliers of systems software products by insisting upon excellence. Join our Systems Software Division in Boston, where you will provide technical assistance in support of our DOS Systems Products.

Responsibilities include:

- Making pre-sales technical and product presentations
- Client and sales training
- Direct involvement with system installation and implementation

Requirements include:

- 5+ years DOS experience in an IBM mainframe environment
- College degree in a related area
- 50% travel
- Strong background in systems or operations
- Good communication, presentation and interpersonal abilities

If your software has to be the best, your choice has to be UCCEL. For immediate consideration, please submit résumé, including salary requirements to:

UCCEL Corporation
135 Federal St.
Boston, MA 02115
ATTN: See Ransdell

UCCEL

Where You Excel.

An Equal Opportunity Employer

THE NEWLY FORMED COLUMBIA FALLS ALUMINUM CO.

is currently seeking qualified professionals to be part of a small employee team.

TECHNICAL SUPPORT ANALYST/ISR

Install and maintain systems software and act as technical expert on all hardware and software in use.

Requirements:

2-10 years experience with IBM mainframe mainframes (370/136 through 4341-11) as system programmer with VM, DOS/VSE, CMS, and VME; knowledge of VME, VMEbus, and VMEbus add-on boards; Good communications ability and proven technical ability.

We Offer:

- A competitive salary
- Excellent benefits
- Plenty of challenge
- Opportunity for advancement

Plus:

The beauty of the Flathead Valley and Glacier National Park. Please forward your resume, salary history and requirements in confidence to:

COLUMBIA FALLS ALUMINUM CO.
P.O. Box 100
Columbia Falls, MT 59821
Attn: Charles Tracy CSE
(406) 865-2261

Equal Opportunity Employer

SENIOR PROGRAMMER ANALYST

General Dynamics Data Systems Division has an immediate opportunity at its Corporate Headquarters in St. Louis to support pricing management in contract proposals development, acquisition analyses, and cost-to-complete programs.

The ideal candidate will have a minimum 2 years' experience in the use of BCS Executive Information Services (EIS) software as run on the VMS/CMS operating system, as well as proficiency in EIS modeling, data base management, and report generation. Preferred qualifications: Bachelor's degree in Computer Science, Math, MIS, or equivalent. Must be willing to travel.

General Dynamics offers an attractive salary and comprehensive benefits.

For immediate consideration, send your resume to: Manager, Business Systems Development, General Dynamics Data Systems Division, P.O. Box 748, Mail Zone 5304, Drawer 153, Fort Worth, TX 76101.

GENERAL DYNAMICS

Data Systems Division

U.S. Citizenship Required

An Equal Opportunity Employer

POSITION ANNOUNCEMENTS

POSITION ANNOUNCEMENTS

INDIANA UNIVERSITY**Administrative Computing**

We are inviting interested individuals to join us in our operating environment of two large IBM computers operating under OS/VS, with COBOL/CICS, and a network of over 900 interactive terminals. We offer the conveniences of a small town, the educational and cultural advantages of a university environment, and the rewards of leading edge professional projects.

ANALYST/PROGRAMMERS - Exceptional opportunity for those with 2 or more years experience, good communication skills, and the opportunity to work with the latest computer technology. Responsibilities include analysis, design, programming, implementation and maintenance of on-the-computer systems.

SOFTWARE ANALYST/PROGRAMMERS - A broad range of opportunities for individuals with at least 2 years experience in capacity planning, system analysis, and systems design.

SYSTEMS PLANNING ANALYSTS - Challenging position in our systems planning area for individuals with 3 or more years of applications, design or systems programming experience on large mainframe systems. Knowledge of architectural models and standards for designing computerized management information systems to serve the university.

TELECOMMUNICATIONS ANALYST/PROGRAMMERS - Responsibilities will include the design, development, implementation, testing, documentation and maintenance of networks, evaluation of telecommunications hardware and software products and network analysis. A minimum of 3 years of related experience is required.

CUSTOMER LIASION - Professionals with a minimum of 3 years of experience in sales and marketing to the primary interest in administrative computing customers to provide consulting, education, problem solving, planning for computing and office automation services. Experience in sales and marketing required.

MANAGER, COMPUTER SERVICES - Responsibilities will include management, training and evaluation of mid-size systems, data administration and security, technical library and education materials, forms control and technical documentation in support of all highly technical staff in the computer center. A minimum of 3 years computing experience required; Master's degree desirable.

PROCEDURE - We offer competitive salaries, commensurate with qualifications and experience. All positions require a Bachelor's degree. If you have demonstrated your ability to meet our needs and have the desire to contribute a significant professional contribution, send your resume and salary history in confidence at the personnel office to: Mr. Richard L. Johnson, Department of Personnel, 440 East 7th Street, Bloomington, Indiana 47405. (317) 855-5000. Mail resume to: R.L.J. Box 5000, Dept. M, 440 E. 7th St., Bloomington, IN 47405.

An Equal Opportunity Employer

SOFTWARE PROFESSIONALS**Consulting Opportunities**

- Most Critical Contract Assignment Needs:
- TANDEM NON-STOP II INSTALLATION
- DEC VAX COBOL PROGRAMMERS
- IBM MVS/XA SYSTEM PROGRAMMERS
- MANY OTHER MIS REQUIREMENTS

All positions require at least 2 yrs. experience and an ability to adapt to new environments.

The benefits of contracting with CSI are:

Diversity: A wide range of customers, applications, and environments.

Controllability: Your resume is only forwarded upon your specific permission for each potential assignment.

Independence: All contractors remain independent while CSI negotiates the best possible pay for their skills.

Both experienced contractors and those seeking their first-time assignments are welcome to call or send resume to:

Ann Drisko, (617) 446-0620

Computer Skills International Inc.

468 Boston Post Road
Village Park
Marlboro, MA 01752

The Computing Services Office of the University of Illinois is seeking individuals for the following position:

RESEARCH PROGRAMMER
Small Systems Support (C-1)

Sophomore applicants will join a group providing technical support to academic departments and individual faculty members. Primary responsibilities will consist of the use of an array of computer systems for research experiments. Duties will include the use of various computer systems in a research environment, with emphasis on graphics, statistics, or numerical modeling. Some travel may be required. Minimum requirements include a bachelors degree in a related field, plus three years of relevant experience. Salary range \$21,000 - \$24,000. Starting date flexible.

RESEARCH PROGRAMMER

(Systems Programmer) - IBM VM/CMS Support (A-2) Graduate students with prior experience in modeling and simulation, programming, and system support are invited to apply. Primary responsibilities will consist of the use of an array of computer systems for research experiments. Duties will include the use of various computer systems in a research environment, with emphasis on graphics, statistics, or numerical modeling. Some travel may be required. Minimum requirements include a bachelors degree in a related field, plus three years of relevant experience. Salary range \$21,000 - \$24,000. Starting date flexible.

In order to receive full consideration, applications must be received by March 12, 1986. Send resume to: University of Illinois, 100 Digital Drive, Dept. L, U of I, Springfield, IL 62704. Phone (217) 545-1827.

AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER

COMPUTERWORLD

POSITION ANNOUNCEMENTS

COMPUTER INDUSTRY

AST buys into memory mart

Camintonn acquisition rounds out product line

By Peggy Watt

IRVINE, Calif. — AST Research, Inc., is dipping into the world of Digital Equipment Corp. memory products in an appropriate way for the firm to round out its product line and compete in a crowded market, said those who watched Camintonn Corp. join the AST camp last week.

AST announced the acquisition of Santa Ana, Calif.-based Camintonn, which makes memory management products for DEC's Q-Bus, Microvax II, VAX 11/730 and 11/780 computer systems, and communications interfaces for the Q-Bus. Camintonn also has an OEM contract with DEC for PDP-11 memory systems.

Products from the Camintonn purchase become the third prong of AST's family of memory and expansion boards, which currently includes boards for the IBM Personal Computer and the Apple Computer, Inc.

Founded in 1981 by John Tu, David Sun and David Tang, Camintonn is only a year younger than AST. The privately held company, estimated at \$7 million, has 14 employees — all of whom will move to AST at Irvine. All

three engineer-founders are still involved, and Tu will remain as head of the firm, reporting to Thomas Yuen, AST executive vice-president.

AST has been eyeing the Microvax market and plans to expand it for some time, according to Bruce Edwards, AST vice-president for finance. He said the company was reluctant to start from scratch and earmarked its second public offering, which raised \$13 million in May, for acquisition.

AST is interested in larger systems partly because of industry focus on connectivity. AST wants to link DEC equipment with both IBM and Apple systems, said Was S. Szeto, new product director and one of AST's liaisons to Camintonn.

"We'd like to connect all of them."

"We've been talking about gate-way products," Szeto said. "One day we'd like to connect all of them." Camintonn's first products under the AST umbrella will also appear this year, including memory boards for the PDP 11/84, VAX 11/780 and VAX 8000, and VMEbus and more communications interfaces, company officials said.

AST plans to retain Camintonn's name on its products and add only the phrase, "An AST Research Company."

Tandon charged in joint patent suit

LOS ANGELES — Sanders Associates, Inc. of Nashua, N.H., has filed a suit against disk drive manufacturer Tandon Corp. of Chatsworth, Calif., seeking past royalties on its dual-sided floppy disk drives.

Filed last week in Los Angeles District Court by Sanders and Hydrogen Energy Corp. of Kansas City, Mo., the suit claims that the technology for the dual-sided floppy disk drives was jointly created by employees of Cali-

fornia Computer Products, Inc. of Anaheim, Calif.

In the late 1970s, California Computer Products was sold to Sanders and Hydrogen Energy subsidiary, Billings Computer Co.

The suit claims that Tandon owns only a portion of the dual-sided floppy disk patent in conjunction with Sanders Associates and Hydrogen Energy.

— Maura McEnaney

IBM review at standstill

From page 114

to report since it began a year ago," says spokesman Lyle Maguire. "But the Justice Department did not put a deadline on it."

A major reorganization at the Justice Department last fall is primarily responsible for the slowness of the Consent Decree review, sources say. Formerly under the auspices of the department's intellectual properties unit, the review was transferred to the office of the general counsel section, as the department consolidated nine former units into five.

Regardless of the eventual outcome of the case, most observers say they feel that IBM is not likely to return to certain pre-Consent Decree business practices. Because IBM derives only about 10% of its hardware revenue from leased equipment, it is doubtful that the company would re-institute its lease-only policy.

"That's a dead letter; market competition would dictate that IBM

would keep selling," says MIT economics professor Franklin M. Fisher, author of a 1983 book on federal antitrust action against IBM.

IBM observer Bob Djurdjevic, president of Annex Research in Phoenix, says that IBM wants to remove the potential threat of antitrust action, particularly regarding its software licensing terms.

"Thirty years later, the software terms are essentially equivalent to lease only," Djurdjevic says. "They have a lump payment that implies it's a purchase, but it's not so. The title and ownership rights still remain with IBM. That could be viewed as violating the Consent Decree."

Both groups believe it is not likely to spur the Justice Department into a quick review, says Jim Sims, a Washington, D.C., attorney and former deputy assistant attorney general in the department.

"Conceptually, department officials are generally quite open to these things, but they're not high-priority items," Sims says. IBM's interest may be more in cleaning up the books than anything else, and if the department perceives that, it wouldn't be a priority item."

Public offerings present temptation for investors



ACTIVE ISSUES

Kathy Portous

The opportunity to be among the first to invest in highly promising companies becomes particularly tempting when firms with established track records, such as Microsoft Corp. and Sun Microsystems, Inc., file their initial public offerings (IPO).

According to leading underwriters of high-technology companies, Microsoft and Sun are just two of many "seasoned" technology firms that are going public during the next several months.

Stimulating IPO activity is the strong stock market, which technology issues have regained popularity among institutional investors. This receptive environment prompts mature companies to go public because the value they attach to themselves can match the initial offering price investors are willing to pay.

Activity in initial technology offerings is currently so brisk that some investors have begun speculating whether 1986's IPO market, already the largest ever, will be a ball market for technology public offerings. In 1983, investor euphoria for high-tech stocks enabled many fundamentally weak companies to go public at premium prices.

According to underwriters, 1983's "early harvesting" of young technology companies created a void in IPO activity for the next two years. But underwriters maintain that the emotions that swept over high-tech stocks in 1983 will be gone today as a public offering market is marked by mature, high-quality firms. "Such selectivity in technology offerings should continue," says Christopher Covington, director of corporate finance with Robertson, Colman & Stephens, because investors are "still looking for numbers

—Portous is president of Strand Research Associates, a Cambridge, Mass.-based company that provides customized research services for financial and high-tech firms.

Lessons try to change habits

From page 114

But corporate users, to this point, still prefer to have their micros outright. "When you compare it with a lease price, a new microcomputer is not that expensive, the payback is fairly quick, and prices are still coming down," says Roy Hill, chief systems programmer for Detroit-based Blue Cross & Blue Shield of Michigan. Hill says that the \$70 to \$100 per month that the Farah Group charges to lease computers sounds like a low

price but that is because the products

not concepts." Richard Franyo, director of corporate finance with Alex Brown & Sons, concurs. "I'm not sure the wounds from 1983 have healed," he says, "so I think investors will be cautious and buy new issues of quality technology companies at proper price deals."

Not everyone, however, agrees with this outlook. Mason Slaine, president of Dealers' Digest, Inc., which publishes the weekly newsletter "Going Public: The IPO Reporter," says he believes "in a month or two, the high-tech IPO market will become much hotter than it is now. Because of this, we again see the poor quality offerings of 1983."

What will finally determine the health of the year-end public offering market is how well the stock market and technology offerings will perform over the next months. This is one reason all eyes focus on the public offerings of Microsoft and Sun.

According to Robert Natale, editor of Standard & Poor's "Emerging and Special Situations" investment service, Microsoft's issue, expected to be priced between \$16 and \$19, is reasonably priced given the company's impressive margins, broad product line and growth prospects. Both Natale and Slaine of Dealers' Digest say Sun's recent margin pressures and increasingly competitive environment do not justify an initial offering price of \$55 times earnings. "I think Sun will be a trading vehicle," Natale adds.

But "Value Line New Issues Service," an IPO-tracking publication, currently lists Microsoft and Microsoft and Sun for purchase.

Public offering investment services and underwriters agree on at least one thing: Individual investors should proceed with utmost caution.

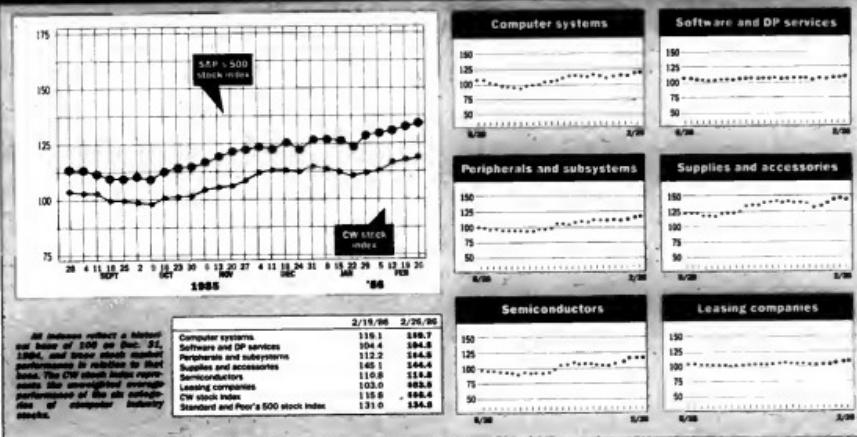
Because institutions dominate 70% to 80% of the market, Covington of Robertson Colman says the best an individual can hope to do is "steal volatility." Another underwriter suggests participating in public offerings via mutual funds.

"I'd like to advise any individual," Slaine warns, "I'd say stay away."

Unlike major corporations, many small businesses lease micros because it is less expensive. "It's unusual they lease because there is no down payment, or it's minimal, and they can write it off all. They don't tie up their money," says Howard Lefkowitz, president of retail dealer HLA Computers, Inc. of Beltsville, Md.

According to a Future Computing, Inc. survey done last year, 37% of microcomputer dealers already offer some form of leasing, and that list includes such heavyweights as Comptuerland Corp., Ente Computer Centers and Microage.

Computerworld stock trading index



Computerworld stock trading summary

EXCH: N = NEW YORK, A = AMERICAS, P = PACIFIC, S = SOUTHERN,
I = INDIA, M = MIDDLE EAST, D = DATA, THE = THE GLOBE

2000 WORDS ARE THE NUMBER ONE REASON FOR FAILURE.

**OFF-PRICE PRICES ARE REG. PRICES AS OF 3 P.M. ON 12/21/00
TO THE NEAREST DOLLAR**

1996-1997

Believe. Write. Quicken. Live.

COMPUTER INDUSTRY

INSIDE

AT&T Chairman Charles Brown tells stockholders he will retire this year/**92**

Datapoint reports an \$8.4 million second-quarter loss/**92**

The state of Michigan loses venture capital in a failed software start-up/**93**

Individual investors should be wary of the red-hot initial public offering market/**112**

INSTANT ANALYSIS

"We're not interested in being a home computer company. I haven't seen anybody make any money, since I've been in the industry, as a home computer maker."

— John Sculley, chairman, chief executive officer and president of Apple Computer, Inc.

IBM review at a standstill

Thirty-year-old Consent Decree remains in effect

By Clinton Wilder

In the year since IBM acknowledged its attempt to have various antitrust restrictions on its business removed (CW, March 11), a bureaucratic reorganization in the U.S. Department of Justice has virtually halted the review process. Both sides stress that, despite the lack of activity to date in reviewing the 1956 Consent Decree, the inquiry remains open.

"There has been no decision to close that inquiry," says Kevin Sullivan of the Justice Department's Antitrust Division. "We may move slowly on things, but we don't simply drop something without conveying that to the parties. Other than that, I can't discuss it because it is still under inquiry."

IBM's effort to be freed from provisions of the Consent Decree has been strongly

opposed by the Computer Dealers and Lessors Association (CDLA). The group feels that independent leasing firms could be jeopardized if IBM were not required to cooperate with third-party firms in areas such as parts availability and customer support.

Top CDLA officials declined to comment on the Justice Department's review, but leasing firms say that, for the moment, lack of action on the department's part has slowed a decision against IBM. "Basically, no news is good news," says Paul Fish, lead counsel for independent leasing industry member Comdisco, Inc. "IBM continues to be bound by the decree. This case is not a high priority, as far as I know. But those things can change, obviously."

"The general consensus in the industry is that it's a dead issue right now," says Robert Bardagy, Comdisco's senior vice-president of marketing. "It has been in a permanent limbo state."

IBM agrees that the review has been essentially dormant. "We have nothing more

See IBM page 112

INDUSTRY INSIGHT

Clinton Wilder

Vendors help stack the DEC

The Digital Equipment Corp. bandwagon is getting more crowded by the week.

Long a media whipping boy for its lack of marketing focus, personal computer debacle and reluctance to hook into the IBM world, DEC seems to be making new friends all the time in the journalistic, financial and computer industry community, with a surprising amount of success.

For the reasons behind this phenomenon, one need look no further than the Dowdwell exhibit halls of three Boston hotels last week or the pages of the trade press for the just few months.

The proof, as they say, is in the products.

The advantages of DEC's well-timed (or perhaps just fortuitously timed) new product cycle, coming on the heels of industry-slump cost-cutting, have been well documented by analysts and reporters. "Well positioned for limited solid growth" has lately become almost a DEC cliché — one that any major computer maker would love to share.

Even Barrow's, the financial weekly not noted for singing corporate praises, has advised (or at least quoted others' advising) its readers to be "fully invested" in the Ken Olsen empire. And *The Boston Globe*, which has been far from Olsen's best friend over the years, is writing breathlessly about how Dowdwell fills every high-ticket hotel room in town, fulfilling "a major goal of the Greater Boston Convention and Tourism Bureau."

See VENDORS page 93

Wilder is Computerworld's senior editor, computer industry.

Micro leasing companies try to change old market buying habits

By Douglas Barney

The concept of microcomputer leasing has yet to take off in corporate America, which still prefers the outright purchase of micros that are steadily declining in price. But both large and small leasing companies are trying to change that.

Seeking to apply the principles that have made mainframe leasing successful, leasing companies such as ITT Commercial Finance Corp. continue to push the leasing option, and in the entrant, the Farah Group, is willing to invest up to \$45 million per month to get its micro lease program off the ground.

Marlton, N.J.-based Farah, along with its affiliate, SGC Marketing, Inc. of Toronto, is now offering a program called Lease Plus to computer dealers in the U.S. and Canada. "We see signing up 1,000 dealers in 1986," says Joe Chirico, president of

Farah. So far, Farah has signed agreements to offer NCR Corp. and Ing. C. Olivetti & Co. SpA micros for lease and is negotiating with other vendors.

But in addition to facing heavy competition from the likes of ITT Commercial Finance and others, Farah must overcome the reluctance of major corporations to lease microcomputers, if it is to crack the corporate market.

ITC is also sitting still, either. It is attempting to find its position as the leading financier of computer dealers' inventory to reach national leasing agreements with IBM and Compucom Computer Corp. "We are attempting to enter that arena with them, but that is a selling job on our part," says Ronald Worrell, division vice-president for ITT Commercial Finance's Fast Forward Leasing Division.

See LESSORS page 112

Peachtree Software hopes it has weathered the storm

Company tries to regain accounting market lead

By James A. Martin

NORCROSS, Ga. — After a lengthy period marked by layoffs, redesigned management structure and discontinued products, Peachtree Software, Inc., is attempting to position itself for a return to its days as a leading microcomputer accounting software vendor for small businesses.

"Peachtree Software is alive and well in Norcross," says J. William Goodwin III, president of the former Management Sciences America, Inc. (MSA) subsidiary that is now an Intelligent Systems Corp. company. "We have several new products un-

der way now that we'll be announcing at spring Comdex and then some more later on in the year. I feel like we are doing the right things, even though the process is frustratingly slow."

After developing a widely diversified micro product line under MSA, Peachtree now markets just four programs — two accounting packages and two productivity aids. "We would like to be to small business accounting what Lotus Development Corp. 1-2-3 is to spreadsheets," Goodwin says.

Mainframe software vendor MSA announced plans to divest itself of its

3-year-old Peachtree micro software division in October 1984. At the time, MSA said that some \$10 million of the company's \$12 million year-to-date operating losses were directly attributable to Peachtree. The micro software market was beginning to bottom out, and MSA found it increasingly difficult to juggle both micro and mainframe products in a changing marketplace.

In May 1985, Intelligent Systems acquired Peachtree for an undisclosed amount. Intelligent Systems also owns Quadrant Corp., Princeton Graphics Systems, Inc. and Intecolor Corp.

Peachtree's transition from MSA to Intelligent Systems required some major changes. "The first thing we had to do was stem the losses," Goodwin says. "Part of MSA's strategy for Peachtree was to have a broad product line in every area, from large data processing, education, small and large business. That turned out to be too much to bite off, and so part of the strategy I have encouraged at Intelligent Systems is to narrow our market focus to the small business market."

As a result, the Peachtree product line was cut by about 75%. MSA sold its Micro Distribution Division to Corporate Software, Inc., its Eduware and Designware programs to Encyclopedia Britannica, Ltd. and See PEACHTREE page 90



J. William Goodwin,
Peachtree president

We interrupt our advertising for a special message to Forte and IRMA customers.

The makers of today's most advanced micro to mainframe links have joined forces. Which says a lot about advancements you can expect in tomorrow's micro to mainframe links.

IRMA was the first emulator to bring PCs into the mainstream of the IBM® 3270 environment, and is the *de facto* industry standard.

Forte has been responsible for a number of technological advances, such as soft loaded upgrades and mainframe graphics for PCs.

Whichever company you've done business with, you can expect to continue to do business as usual—only better. You'll be talking to the sales and support people you already know. The only difference is, they'll have more connectivity solutions to offer.

What's more important is the acceleration of

new product introductions you can expect in the future. Of the millions of dollars DCA and Forte spent on research and development last year, much went toward parallel solutions to the same problems. Because our efforts will be coordinated, you'll be seeing new products and enhancements introduced sooner than you may have expected.

And with increased compatibility, both in hardware and software, you can look forward to a single upward migration path. One that helps you make the most of the micro to mainframe links you already have in place. And enables you to keep up with IBM's evolving office automation strategy.

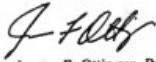
So if you've had any question about where the future standards in micro to mainframe communications would come from, you now have the answer.

DCA. And Forte.



Bert Nordin, President

Digital Communications Associates
1000 Alderman Drive
Alpharetta, GA 30201 (800) 241-IRMA



James F. Ottinger, President

Forte Communications, Incorporated
2205 Fortune Drive
San Jose, CA 95131 (800) 233-3278



Forte is a trademark of Forte Communications, Inc. DCA and IRMA are registered trademarks of Digital Communications, Inc. IBM is a registered trademark of International Business Machines.

Ven-Tel's Half Card™ modem is in all the best computers. Here's why...

Ven-Tel gives you lots of reasons to buy our Half Card™ modem for your IBM PC or compatible. The Half Card™ is a complete system that lets you communicate with other PCs, mainframes, and databases effortlessly. It includes Crosstalk-XVI® software. It's reliable. It's got all of the features you want. And it's a good value.

Do You Own One of These Computers?

Chances are you do. And if you're thinking of buying a modem, consider the Half Card™. Because of its small size, the Half Card™ fits in more computers, including all of the models we've listed here. The Half Card™ is small, so it fits in short slots or long. That means you can save your long slots for other expansion uses.

Effortless Communication

Each Half Card™ comes with Crosstalk-XVI® communications software, by Microsoft. It's the easiest to use, whether you're a beginner or an old hand, and the most powerful. A full on-line help menu makes using Crosstalk® for the first time a snap. It can turn your PC into a terminal on a mainframe computer with its powerful terminal emulation feature. It will even operate your PC when you're not there. You can call into an information service such as The Source or Dow Jones News Retrieval, or transfer files and electronic mail, all at the touch of a button. The Half Card™ connects your computer to the world. Effortlessly.

More Modem for Your Money

When you buy the Half Card™, you don't need anything else. The Half Card™ is a complete communications package that includes a full-featured modem and the best known software on the market. Complete easy-to-understand instructions with full technical support on installation and use. And a very competitive price. The Half Card™, with Crosstalk-XVI® software, retails for only \$549.

Features

- 1200/300 baud auto-dial, auto-answer.
- Uses the industry standard "AT" command set.
- Runs with virtually all communications software, including Smartcom II and PC Talk III and integrated packages such as Symphony and Framework.
- Includes Crosstalk-XVI® software.
- On-board speaker and extra phone jack for easy switching from voice to data mode.
- Selective tone or pulse dialing; full or half duplex.
- Automatic answer on any ring.
- True ring or busy signal detection.



Reliability

Ven-Tel has been making modems for 10 years. Our experience shows. Ven-Tel's Half Card™ only has about 70 parts, compared to almost 300 on other modems. We reduced the parts by building the first LSI modem chip using advanced switched capacitor technology. What that means to you is greater reliability and lower power consumption, so you can load up your PC with expansion boards and not worry about heat or power problems. And we back the Half Card™ with a full two-year warranty on parts and labor.



Available Nationwide

The Half Card™ is available through stocking distributors nationwide. Also from Ven-Tel: the 1200 Plus™, an external modem and the PC Modem 1200™, an IBM internal with V.22 international capability.

Effortless Communication

Ven-Tel Inc.

2342 Walsh Avenue
Santa Clara, CA 95051
(408) 727-5721